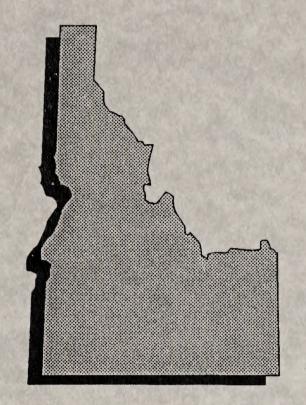


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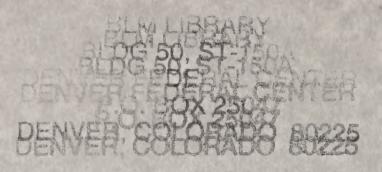


United States Air Force



Idaho
Training
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IDAHO TRAINING RANGE ENVIRONMENTAL IMPACT ANALYSIS PROCESS

United States Air Force Air Combat Command

November 1993

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EXECUTIVE SUMMARY

The State of Idaho proposes to establish, operate, and maintain a tactical training range as part of the integrated set of training assets in southwestern Idaho. This range would increase the realism and quality of training for the U.S. Air Force's Composite Wing and Idaho Air National Guard. Used in conjunction with Saylor Creek Range, a set of 32 proposed emitter sites, and existing and proposed airspace, this range would make simulation of a wide variety of battlefield environments possible. To provide sufficient land to accommodate a new range, the State of Idaho proposes to execute a land exchange for public lands under the administration of the U.S. Department of Interior, Bureau of Land Management (BLM).

To effect the proposed exchange with the State of Idaho, the BLM must comply with the regulations defined under the Federal Lands Policy and Management Act (FLPMA) governing such exchanges [43 CFR (2310.3-2)(b)(2)(iii)]. This Technical Support Document (TSD) and accompanying U.S. Bureau of Mines' (BOM) Mineral Assessment have been prepared to comply with the defined requirements of the FLPMA regulations. This document also provides the basis for assessing mineral resources and potential impacts to those resources for the range alternatives examined in the associated *Idaho Training Range Draft Environmental Impact Statement (EIS)* prepared by the U.S. Air Force in cooperation with the State of Idaho, BLM, Federal Aviation Administration, and BOM. The draft EIS, as required by the National Environmental Policy Act and its regulations, evaluates the environmental consequences of the proposed range and alternatives, including the effects of the land exchange and other actions affecting mineral resources. In contrast, in meeting the requirements of FLPMA, the TSD focuses on only those lands involved in the proposed exchange and their mineral resources.

As a result of the analysis presented in this TSD, no conflicts with mineral resources of any significance would occur on selected or offered lands involved in this exchange for the state-proposed air-to-ground training range. Only one area of moderate mineral potential is known to exist within selected lands associated with three of the alternatives.

The Pole Creek area, a portion of which lies within public lands proposed for exchange, contains recreational placer gold resources and low-grade epithermal gold deposits. To date, no detailed studies have been conducted to specifically assess this potential. The development and use of a state-owned training range is not anticipated to substantially impact the accessibility to any of these epithermal or recreational-grade placer gold deposits along Pole Creek.

In addition, an economically valuable diatomite deposit and mine exist in the vicinity of three of the range alternatives. This deposit and mine, owned by Grefco, Inc., is not currently in operation and has no BLM-approved plan of operations. Furthermore, the Grefco diatomite deposit is not located within selected or offered lands for any of the range alternatives. However, access roads proposed by Grefco, Inc., would cross through target areas associated with three of the alternatives. Under the provisions of the Mining Law of 1872, the BLM and State of Idaho would be required to permit reasonable access to the mine, even if an exchange occurs and a training range is developed.

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1.0 INTRODUCTION

1.1 PURPOSE

The State of Idaho proposes to establish, operate, and maintain a tactical training range as part of the integrated set of training assets in southwestern Idaho. This range would increase the realism and quality of training for the Composite Wing and Idaho Air National Guard. Used in conjunction with Saylor Creek Range (SCR), a set of 32 proposed emitter sites, and existing and proposed airspace, this range would make simulation of a wide variety of battlefield environments possible. To provide sufficient land to accommodate a new range, the State of Idaho proposes to execute a land exchange for public lands under the administration of the U.S. Department of Interior Bureau of Land Management (BLM).

To effect the proposed exchange with the State of Idaho, the BLM must comply with the regulations defined under the Federal Lands Policy and Management Act (FLPMA) governing such exchanges. With regard to mineral resources, deposits, and mining operations, these regulations [43 CFR (2310.3-2)(b)(2)(iii)] require a mineral resource analysis that includes:

General geology, known mineral deposits, past and present mineral production, mining claims, mineral leases, evaluation of future mineral potential, and present and potential market demands.

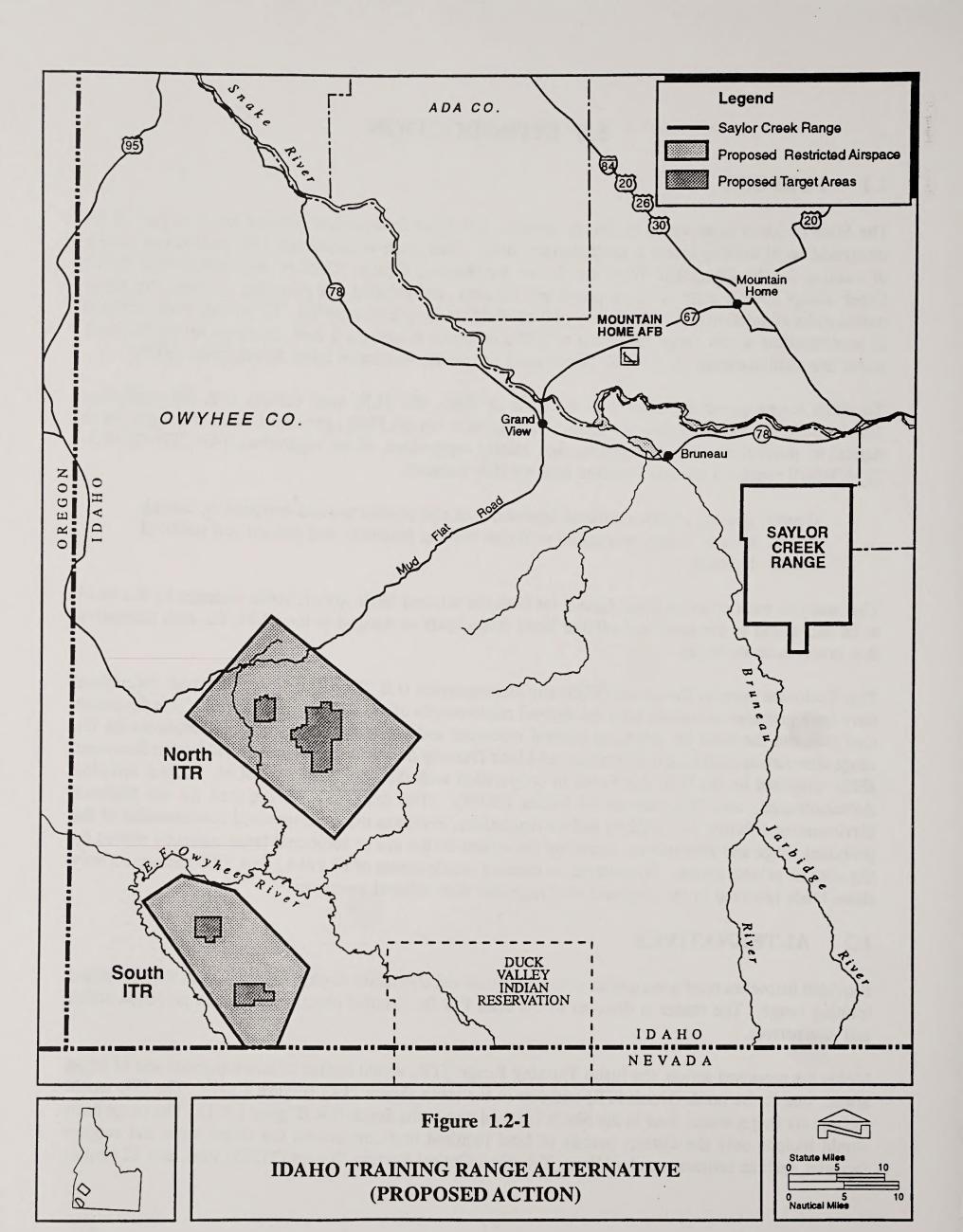
This analysis must consider these factors for both the selected lands (public lands managed by the BLM to be exchanged to the state) and offered lands (state lands exchanged to the BLM) for each alternative that involves an exchange.

This Technical Support Document (TSD) and accompanying U.S. Bureau of Mines' Mineral Assessment have been prepared to comply with the defined requirements of the FLPMA regulations. This document also provides the basis for assessing mineral resources and potential impacts to those resources for the range alternatives examined in the associated *Idaho Training Range Draft Environmental Impact Statement (EIS)* prepared by the U.S. Air Force in cooperation with the State of Idaho, BLM, Federal Aviation Administration, and U.S. Bureau of Mines (BOM). The draft EIS, as required by the National Environmental Policy Act (NEPA) and its regulations, evaluates the environmental consequences of the proposed range and alternatives, including the effects on the use of additional lands currently owned by the state or private parties. In contrast, in meeting requirements of FLPMA, this TSD focuses on only those lands involved in the proposed exchange and their mineral resources.

1.2 ALTERNATIVES

Provided below are brief descriptions of the proposed and alternative configurations for the state-proposed training range. The reader is directed to the draft EIS for detailed descriptions of the proposed action and alternatives.

Under the proposed action, the Idaho Training Range (ITR) would consist of two separated sets of target areas: one in the north (North ITR) and one in the south (South ITR) (Figure 1.2-1). The ITR would include six target areas: four in the North ITR and two in the South ITR (Figure 1.2-1). The range itself would include only the distinct parcels of land required to accommodate the target areas and support facilities such as maintenance buildings, Televised Optical Scoring System (TOSS) sites, and 32 emitter



locations. Range facilities would encompass a maximum of 25,320.78 acres. Each of the six target areas would contain a concentration of one or more targets. The lands comprising each target area would include sufficient acres for the targets themselves and a buffer area of at least one-half mile around each target. Existing roads would link these sets of targets internally, although they would not connect the North ITR with the South ITR.

The Consolidated Training Range (CTR) configuration represents a modification of the State's Proposed Range initially introduced and analyzed in the EIS on *Proposals for the Air Force in Idaho*. The CTR involves aggregation of approximately 21,824.51 acres of public, private, and existing state land for the development and operation. The CTR would consist of six target areas with four of these areas matching those proposed under the North ITR. The two additional target areas would be located within one to four miles south of the southernmost North ITR target area (Figure 1.2-2). This alternative includes the same maintenance facility and TOSS sites as for the North ITR, and would involve establishing the same 32 emitter locations.

Under the North ITR and Improved SCR alternative, the North ITR portion of the ITR would be developed and used in conjunction with an Improved SCR (Figure 1.2-3). The improvements at SCR would consist solely of a south-eastward expansion of the existing 12,200-acre exclusive use area to accommodate two additional targets. The expansion would add approximately 17,000 acres to the exclusive use area, but would remain within the lands already withdrawn for military use. This alternative includes all support facilities for the North ITR and the existing facilities at SCR, as well as the 32 proposed emitter sites.

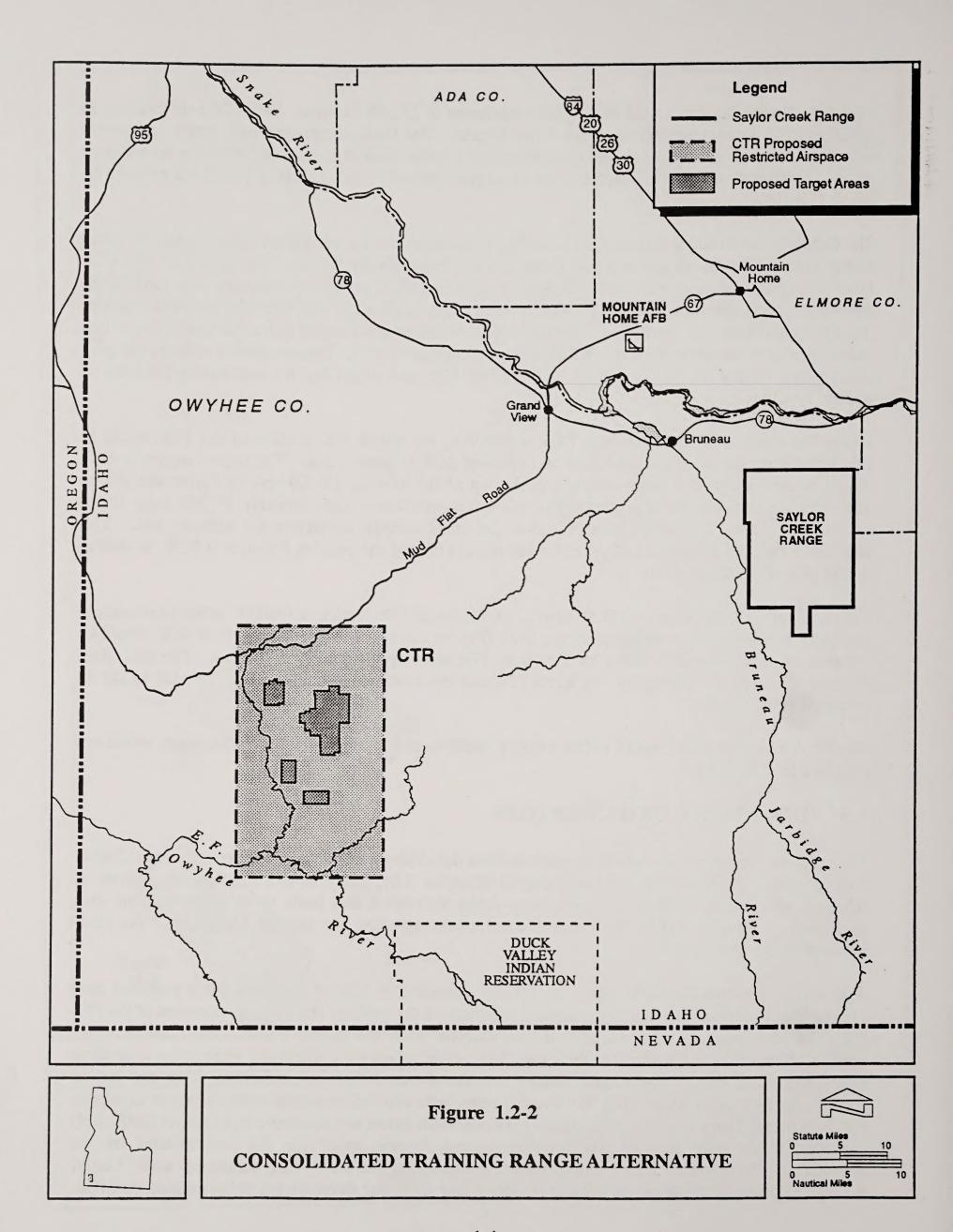
For the South ITR and Improved SCR alternative, the South ITR portion of the ITR would be developed and used in conjunction with an improved SCR (Figure 1.2-4). The improvements at SCR would be identical to those described above for the North ITR and Improved SCR alternative. The alternative includes all support facilities for the South ITR and the existing facilities at SCR, as well as the 32 proposed emitter sites.

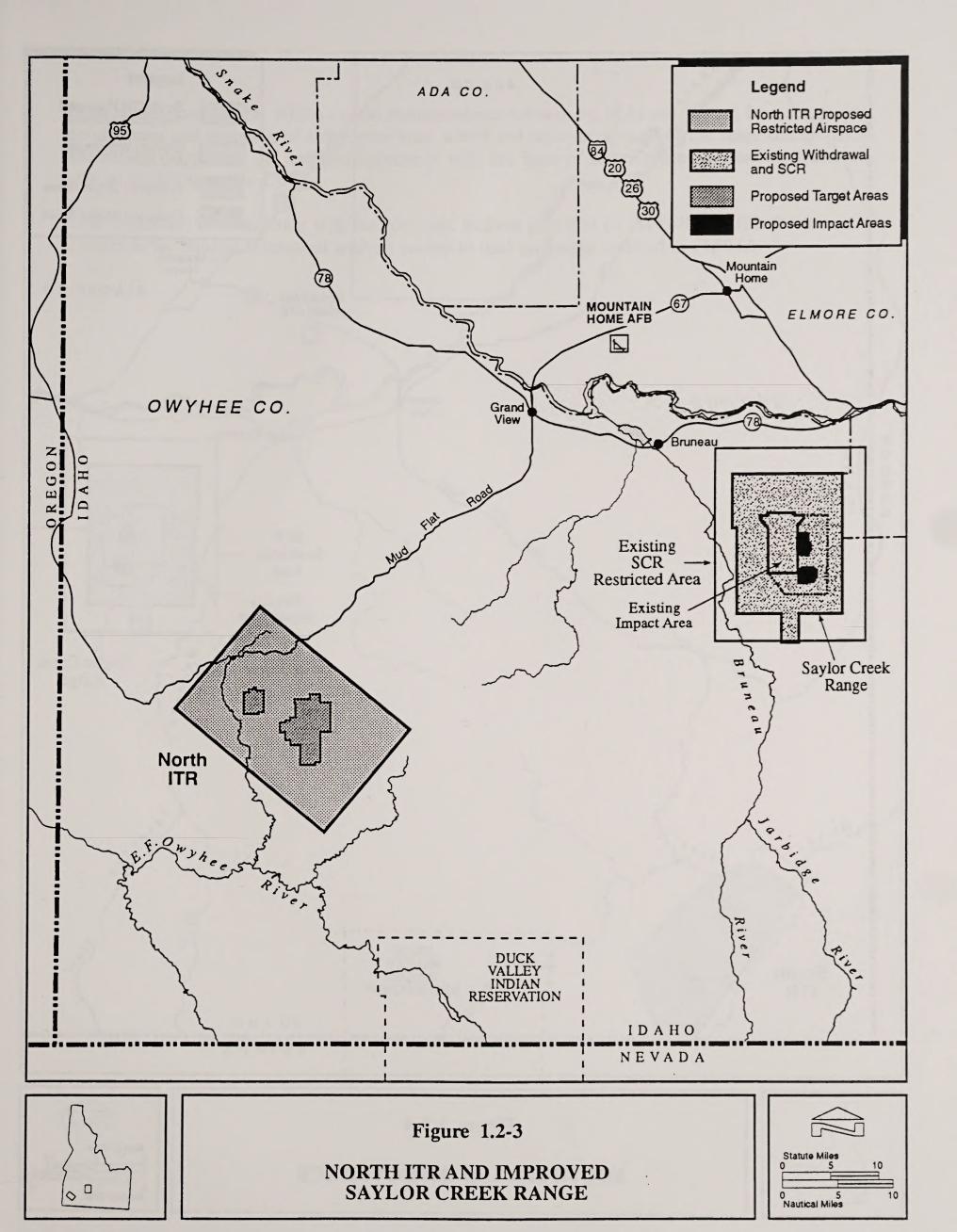
The No-Action alternative would utilize existing facilities and remote ranges and, therefore, would not require a land exchange.

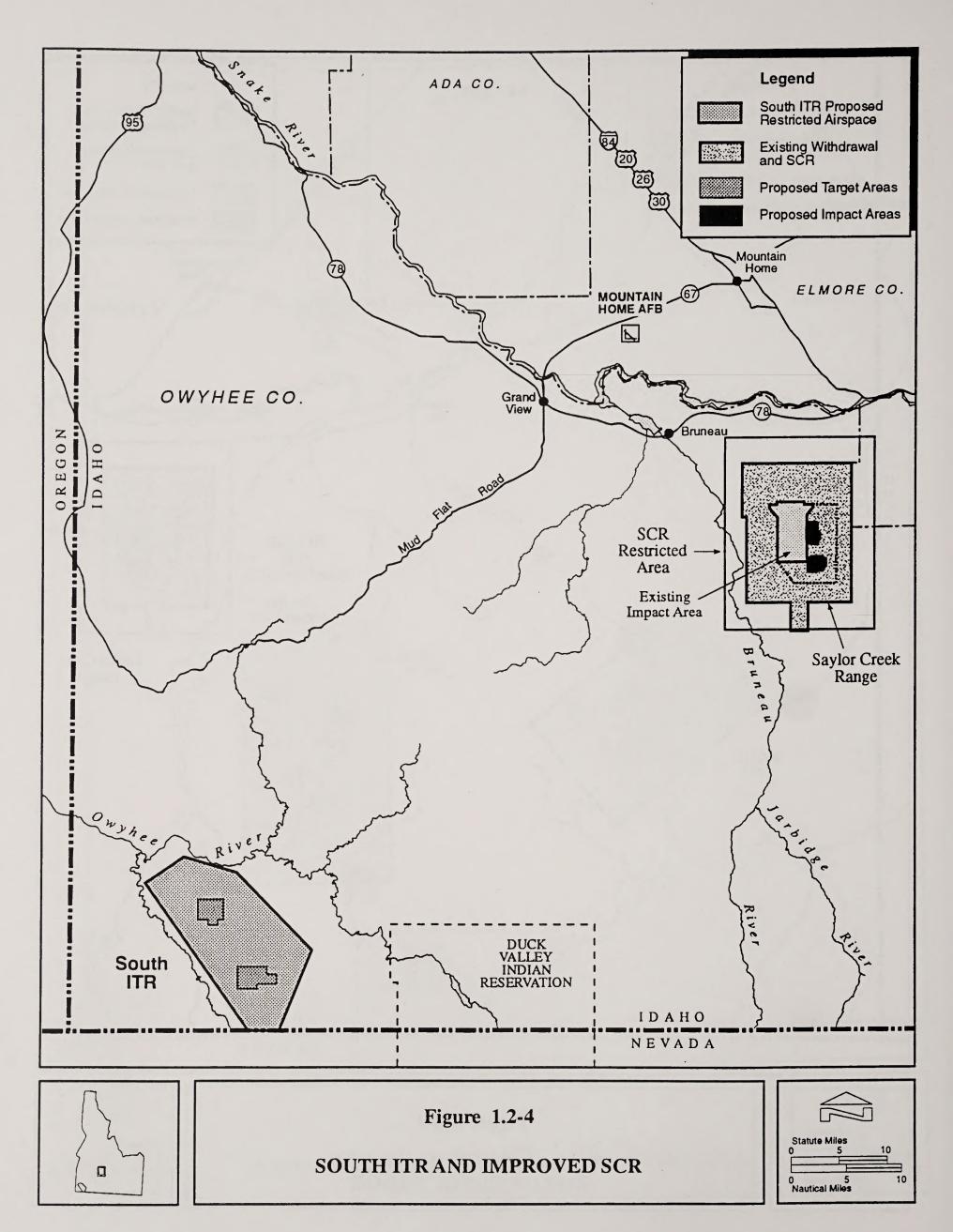
1.3 DOCUMENT ORGANIZATION

The following document contains three main sections describing lands involved in the exchange (Chapter 2.0); geology, minerals, and mineral potential (Chapter 3.0); and claims and/or mining operations (Chapter 4.0). Each section is organized by range alternative and lands to be exchanged for each alternative. Chapter 5.0 briefly presents conclusions regarding the mineral resources of the lands involved in the exchange.

Appendix A presents the BOM report specifically generated to support analysis of this proposed land exchange and alternatives including a detailed summary of the geology and mineral resources of the ITR and CTR alternatives. Also included in the analysis were the Saylor Creek Sites 1 and 2 range configurations (refer to Chapter 2 of the EIS). These alternatives were eliminated early in the alternative selection process due to operational deficiencies (Air Force 1993) and, therefore, were not carried forward for detailed analysis. The BOM report provided a detailed economic analysis related to mining for Owyhee and Elmore Counties and conducted a mine/mill model and economic input-output (IMPLAN) analysis for the only economically feasible mineral deposit underlying the area affected by the alternatives. These models were supported with a methodology section defining parameters used. Lastly, the report summarized impacts to mineral resources and economic development of the deposit modelled.

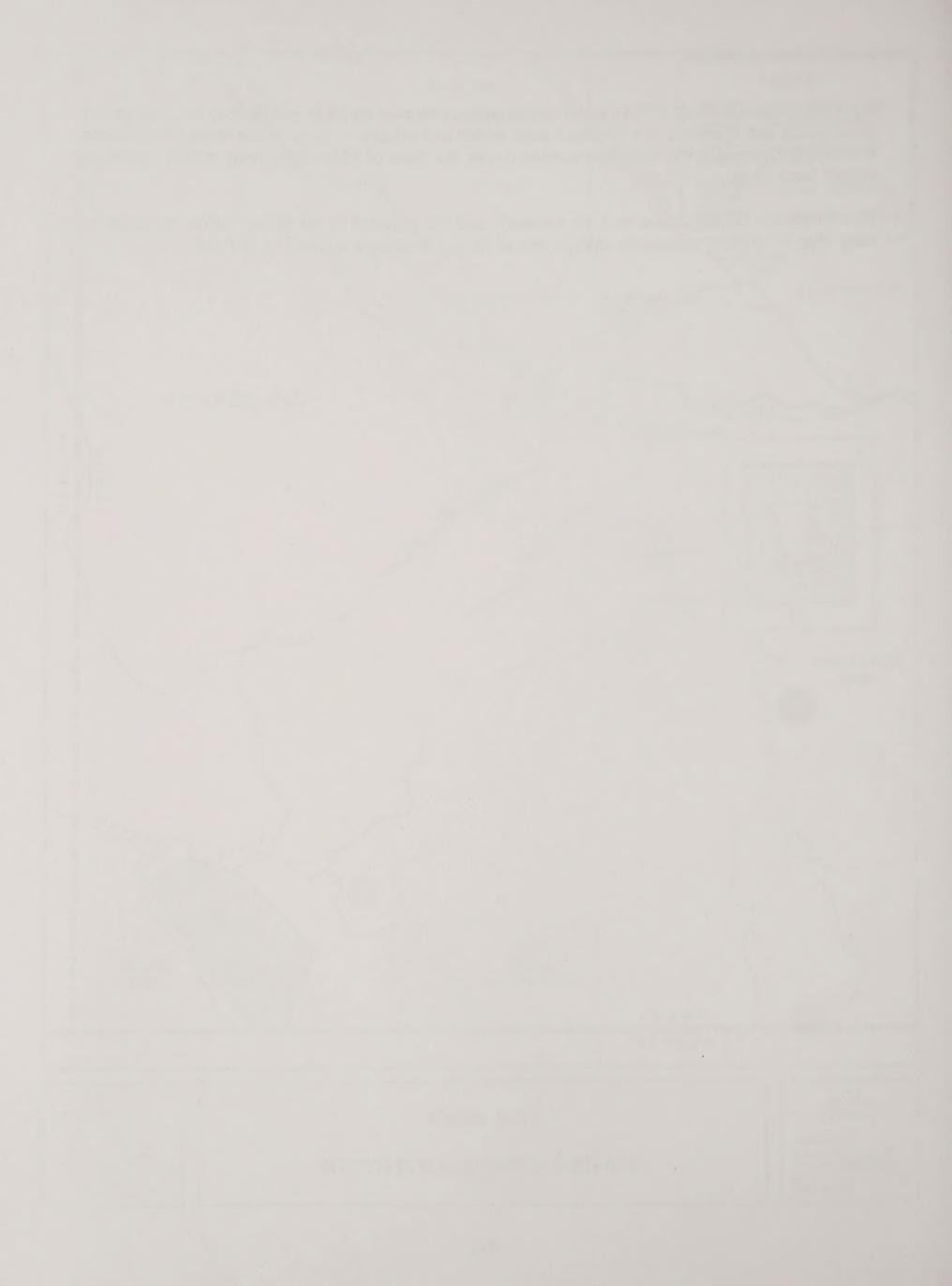






Other appendices include: NEPA-related correspondence between the BLM and Grefco, Inc., concerning development and operation of a diatomite mine within and adjacent to some of the range configuration alternatives (Appendix B); and correspondence with the State of Idaho concerning mining leases on offered lands (Appendix C).

This document, in conjunction with the economic analysis provided by the BOM, fulfills the technical categories for mineral assessment analysis related to land exchanges outlined in FLPMA.



2.0 DESCRIPTION OF THE LANDS INVOLVED

2.1 ITR

2.1.1 Selected Lands

The ITR would consist of six target areas (see Section 1.2) and, as a state-owned and operated range, these facilities would be developed on land consolidated under state ownership. Currently, most of the parcels included in the proposed target areas consist of public land administered by the BLM. The state proposes to acquire these necessary parcels (selected lands) for range development from the BLM through a land exchange process. The exchange process for this alternative would involve one of two options: Option 1 includes selected lands for the North ITR that are located within the boundaries of Wilderness Study Areas (WSAs); Option 2 excludes lands under the WSA designation. Because no South ITR target areas encompass any portion of a WSA, selected lands for the South ITR remain the same under both options. Legal descriptions for these lands under both options are listed in Table 2.1-1.

2.1.2 Offered Lands

In order to effect the exchange for the selected lands, the State of Idaho has offered state lands throughout southwestern Idaho to the BLM. Under the ITR Option 1, 42 parcels totalling 24,578.25 acres ranging from 40 acres to 640 acres have been offered. Under the ITR Option 2, 34 parcels totalling 19,458.25 acres have been offered. These parcels are located in Ada, Elmore, Canyon, Gem, and Owyhee Counties, and within the BLM's Cascade, Bruneau, Jarbidge, and Owyhee resource areas. Most of these state-owned offered lands are surrounded by BLM-designated special management lands such as Areas of Critical Environmental Concern (ACECs), WSAs, or along historic landmarks. Legal descriptions, current use, and projected use (post-exchange) for the offered lands are listed in Table 2.1-2.

2.2 CTR

2.2.1 Selected Lands

The CTR would also consist of a number of discrete target areas and range facilities that would be developed on land consolidated under state ownership and management. Currently, most of the parcels included in the CTR consist of public land administered by the BLM. The state proposes to acquire these necessary parcels (selected lands) for range development from the BLM through a land exchange process. The exchange under this alternative would involve one of two options: Option 1 includes selected lands for the North ITR that are located within the boundaries of WSAs; Option 2 does not include lands under the WSA designation. Selected lands required for the CTR include those identified under each option for the North ITR due to the fact that the northern half of the CTR overlaps with the North ITR. Legal descriptions for these lands under each option of the CTR alternative are listed in Table 2.2-1.

2.2.2 Offered Lands

In order to effect the exchange for the selected lands, the State of Idaho has offered state lands throughout southwestern Idaho to the BLM. Under the CTR Option 1, 34 parcels totalling 19,458.25 acres ranging

TABLE 2.1-1
ITR SELECTED LANDS (OPTION 1)

Township	Range	Section	Legal Description	Acre
NORTH ITR OP	TION 1			
108	2W	30	SW1/4	160.0
10S	2W	31	W1/2	320.0
10S	2W	34	SE1/4	160.0
10S	2W	35	SE1/4, E1/2 SW1/4, NW1/4 SW1/4	280.0
10\$	3W	25	E1/2 SE1/4, SW1/4 SE1/4	120.0
108	3W	35	E1/2	320.0
118	1W	6	Lots 1-7, SE1/4 NW1/4, S1/2 NE1/4,	
			E1/2 SW1/4, SE1/4	634.7
115	1W	7	Lots 1-4, E1/2, E1/2 W1/2	608.50
115	1W	18	Lots 1-4, E1/2, E1/2 W1/2	611.4
115	2W	1	Lots 1-4, S1/2, S1/2 N1/2	554.88
115	2W	2	Lots 1-4, S1/2, S1/2 N1/2	553.04
115	2W	3	Lots 1-2, SE1/4, S1/2 NE1/4	276.03
115	2W	6	Lots 3-13	336.00
115	2W	9	S1/2 SE1/4	80.00
115	2W	10	NE1/4, S1/2	480.00
118	2W	11	ALL	640.00
118	2W	12	ALL	640.00
115	2W	13	ALL	640.00
118	2W	14	ALL	640.00
115	2W	15	ALL	640.00
11S	2W	21	NE1/4, N1/2 SE1/4	240.00
118	2W	22	ALL	640.00
118	2W	23	ALL	640.00
118	2W	24	ALL	640.00
118	2W	25	ALL	640.00
118	2W	26	ALL	640.00
118	2W	27	N1/2 N1/2	160.00
115	2W	35	ALL	640.00
118	3W	1	Lots 1-4, S1/2, S1/2 N1/2	641.00
118	3W	2	Lots 1-2, SE1/4, S1/2 NE1/4	321.13
125	2W	1	Lots 3-4	80.84
128	2W	2	Lots 1-4	162.28
SOUTH ITR				
48	3W	19	Lots 3-4, E1/2 SW1/4	169.88
48	3W	30	Lots 1-4, E1/2 W1/2	339.12
48	3W	31	Lots 1-2, E1/2 NW1/4	169.35
48	4W	23	S1/2	320.00
4S	4W	24	S1/2	320.00
4S	4W	25	ALL	640.00
4S	4W	26	ALL	640.00
4S	4W	35	N1/2	320.00
5S	3W	26	S1/2 N1/2, S1/2	480.00
5S	3W	27	S1/2 N1/2, S1/2	480.00
5S	3W	28	S1/2 N1/2, S1/2	480.00
58	3W	33	ALL	640.00
5S	3W	34	ALL	640.00
ss	3W	35	ALL	640.00
6S	3W	3	N1/2	320.00
6S	3W	4	N1/2	320.00
			2-2 Tota	

TABLE 2.1-1 (Continued)

ITR SELECTED LANDS (OPTION 2)

Township	Range	Section	Legal Description	Acre
NORTH ITR	OPTION 2			
10S	3W	35	E1/2	320.0
11S	1W	6	Lots 1-7, SE1/4 NW1/4, S1/2	
			E1/2 SW1/4, SE1/4	634.7
11S	1W	7	Lots 1-4, E1/2, E1/2 W1/2	608.5
11S	1W	18	Lots 1-4, E1/2, E1/2 W1/2	611.4
11S	2W	1	Lots 1-4, S1/2, S1/2 N1/2	554.8
11S	2W	2	Lots 1-2, S1/2 NE1/4, SE1/4,	
			E1/2 SW1/4	356.7
11S	2W	11	E1/2, E1/2 W1/2, SW1/4 SW1/4	520.0
11S	2W	12	ALL	640.0
11S	2W	13	ALL	640.0
11S	2W	14	ALL	640.0
11S	2W	15	ALL	640.0
11S	2W	21	NE1/4, N1/2 SE1/4	240.0
11S	2W	22	ALL	640.0
11S	2W	23	ALL	640.0
11S	2W	24	ALL	640.0
11S	2W	25	ALL	640.0
11S	2W	26	ALL	640.0
118	2W	27	N1/2 N1/2	160.0
11S	2W	35	ALL	640.0
11S	3W	2	Lots 1-2, SE1/4, S1/2 NE1/4	321.1
12S	2W	1	Lots 3-4	80.8
12S	2W	2	Lots 1-4	162.2
SOUTH ITR				
14S	3W	19	Lots 3-4, E1/2 SW1/4	169.8
14S	3W	30	Lots 1-4, E1/2 W1/2	339.1
14S	3W	31	Lots 1-2, E1/2 NW1/4	169.3
14S	4W	23	\$1/2	320.0
14S	4W	24	S1/2	320.0
14S	4W	25	ALL	640.0
14S	4W	26	ALL	640.0
14S	4W	35	N1/2	320.0
15S	3W	26	S1/2 N1/2, S1/2	480.0
15S	3W	27	S1/2 N1/2, S1/2	480.0
158	3W	28	S1/2 N1/2, S1/2	480.0
158	3W	33	ALL	640.0
15S	3W	34	ALL	640.0
15S	3W	35	ALL	640.0
16S	3W	3	N1/2	320.0
16S	3W	4	N1/2	320.0
			Total	17,888.9

2-3

TABLE 2.1-2
ITR OFFERED LANDS (OPTION 1)

Parcel No.	Location	Resource Area	Acres	Current Use	Proposed Use After Exchange to BLM
1	T6N R1W S34	Cascade	40	Grazing	ACEC
3	T10S R7E S16	Bruneau	640	Grazing	WSA, SRMA
4	T10S R7E S36	Jarbidge	640	Grazing	WSA, SRMA
5	T11S R7E S16	Bruneau	640	Grazing	WSA, SRMA
6	T12S R6E S16	Bruneau	640	Grazing	WSA, SRMA
7	T12S R7E S16	Bruneau	640	Grazing	WSA, SRMA
9	T13S R7E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
10	T13S R7E S36	Jarbidge	640	Grazing	WSA, ACEC, SRMA
11	T14S R8E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
12	T14S R8E S36	Jarbidge	640	Grazing	ACEC, SRMA
14	T15S R1W S16	Owyhee	640	Grazing	WSA
16	T10S R3W S16	Owyhee	560	Grazing	WSA, SRMA
40	T8S R3E S36	Bruneau	640	Grazing	WSA
17	T9S R3E S36	Bruneau	640	Grazing	WSA
18	T10S R3E S16	Bruneau	640	Grazing	WSA
19	T10S R3E S36	Bruneau	640	Grazing	WSA
41	T8S R2E S16	Bruneau	640	Grazing	WSA, SRMA
20	T8S R2E S36	Bruneau	640	Grazing	WSA, SRMA
42	T8S R3E S16	Bruneau	640	Grazing	WSA, SRMA
21	T9S R2E S16	Bruneau	640	Grazing	WSA, SRMA
43	T9S R2E S36	Bruneau	638.16	Grazing	WSA, SRMA
44	T9S R3E S16	Bruneau	640	Grazing	WSA, SRMA
26	T2S R7E S16	Bruneau	577.01	Grazing	Oregon National Historic Trail
27	T3S R8E S16	Bruneau	600	Grazing	Oregon National Historic Trail
28	T3S R8E S22	Bruneau	40	Grazing	Oregon National Historic Trail
29	T3S R8E S36	Bruneau	320	Grazing	Oregon National Historic Trail
30	T1S R2W S36	Owyhee	456.18	Grazing	Snake River Birds of Prey Area
31	T3S R1E S16	Bruneau	226.90	Grazing	Snake River Birds of Prey Area
34	T1N R1W S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
35	T2S R1E S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
36	T3S R2E S16	Bruneau	640	Grazing	Snake River Birds of Prey Area
37	T3S R2E S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
38	T3S R1W S36	Owyhee	640	Grazing	Snake River Birds of Prey Area
39	T4S R1E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
45	T4S R4E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
46	T1S R2E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
47	T3S R3E S36	Owyhee	640	Grazing	Snake River Birds of Prey Area
48	T3S R4E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
49	T2S R3E S 36	Owyhee	640	Grazing	Snake River Birds of Prey Area
50	T2S R2E S36	Owyhee	640	Grazing	Snake River Birds of Prey Area
51	T3S R3E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
52	T5S R2E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
		TOTAL	24,578.25	2-4	

TABLE 2.1-2 (Continued)

ITR OFFERED LANDS (OPTION 2)

Parcel No.	Location	Resource Area	Acres	Current Use	Proposed Use After Exchange to BLM
1	T6N R1W S34	Cascade	40	Grazing	ACEC
3	T10S R7E S16	Bruneau	640	Grazing	WSA, SRMA
4	T10S R7E S36	Jarbidge	640	Grazing	WSA, SRMA
5	T11S R7E S16	Bruneau	640	Grazing	WSA, SRMA
6	T12S R6E S16	Bruneau	640	Grazing	WSA, SRMA
7	T12S R7E S16	Bruneau	640	Grazing	WSA, SRMA
9	T13S R7E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
10	T13S R7E S36	Jarbidge	640	Grazing	WSA, ACEC, SRMA
11	T14S R8E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
12	T14S R8E S36	Jarbidge	640	Grazing	ACEC, SRMA
14	T15S R1W S16	Owyhee	640	Grazing	WSA
16	T10S R3W S16	Owyhee	560	Grazing	WSA, SRMA
40	T8S R3E S36	Bruneau	640	Grazing	WSA
17	T9S R3E S36	Bruneau	640	Grazing	WSA
18	T10S R3E S16	Bruneau	640	Grazing	WSA
19	T10S R3E S36	Bruneau	640	Grazing	WSA
41	T8S R2E S16	Brimeau	640	Grazomg	WSA, SRMA
20	T8S R2E S36	Bruneau	640	Grazing	WSA, SRMA
42	T8S R3E S16	Bruneau	640	Grazing	WSA, SRMA
21	T9S R2E S16	Bruneau	640	Grazing	WSA, SRMA
43	T9S R2E S36	Bruneau	638.16	Grazing	WSA, SRMA
44	T9S R3E S16	Bruneau	640	Grazing	WSA, SRMA
26	T2S R7E S16	Bruneau	577.01	Grazing	Oregon National Historic Trail
27	T3S R8E S16	Bruneau	600	Grazing	Oregon National Historic Trail
28	T3S R8E S22	Bruneau	40	Grazing	Oregon National Historic Trail
29	T3S R8E S36	Bruneau	320	Grazing	Oregon National Historic Trail
30	T1S R2W S36	Owyhee	456.18	Grazing	Snake River Birds of Prey Area
31	T3S R1E S16	Bruneau	226.90	Grazing	Snake River Birds of Prey Area
34	T1N R1W S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
35	T2S R1E S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
36	T3S R2E S16	Bruneau	640	Grazing	Snake River Birds of Prey Area
37	T3S R2E S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
38	T3S R1W S36	Owyhee	640	Grazing	Snake River Birds of Prey Area
39	T4S R1E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
		TOTAL	19,458.25	- 11 1 1 1 T	

TABLE 2.2-1 CTR SELECTED LANDS (OPTION 1)

Township	Range	Section	Legal Description	Acre
108	2W	30	SW1/4	160.0
10S	2W	31	W1/2	320.0
10S	2W	34	SE1/4	160.0
108	2W	35	SE1/4, E1/2 SW1/4, NW1/4 SW1/4	280.0
108	3W	25	E1/2 SE1/4, SW1/4 SE1/4	120.0
10S	3W	35	E1/2	320.0
118	1W	6	Lots 1-7, SE1/4 NW1/4, S1/2 NE1/4,	
			E1/2 SW1/4, SE1/4	634.7
118	1W	7	Lots 1-4, E1/2, E1/2 W1/2	608.5
118	1W	18	Lots 1-4, E1/2, E1/2 W1/2	611.4
118	2W	1	Lots 1-4, S1/2, S1/2 N1/2	554.8
118	2W	2	Lots 1-4, S1/2, S1/2 N1/2	553.0
118	2W	3	Lots 1-2, SE1/4, S1/2 NE1/4	276.0
118	2W	6	Lots 3-13	336.0
118	2W	9	S1/2 SE1/4	80.0
118	2W	10	NE1/4, S1/2	480.0
118	2W	11	ALL	640.0
118	2W	12	ALL	640.0
118	2W	13	ALL	640.0
118	2W	14	ALL	640.0
118	2W	15	ALL	640.0
115	2W	21		240.0
115			NE1/4, N1/2 SE1/4	
115	2W	22	ALL	640.0 640.0
115	2W	23	ALL	
	2W	24	ALL	640.0
118	2W	25	ALL	640.0
118	2W	26	ALL	640.0
118	2W	27	N1/2 N1/2	160.0
118	2W	35	ALL	640.0
118	3W	1	Lots 1-4, S1/2, S1/2 N1/2	641.0
115	3W	2	Lots 1-2, SE1/4, S1/2 NE1/4	321.1
125	2W	1	Lots 3-4	80.8
128	2W	2	Lots 1-4	162.2
12S	2W	5	S1/2 SW1/4	80.0
128	2W	6	Lots 10-11, S1/2 SE1/4, SE1/4 SW1/4	177.2
128	2W	7	Lots 1-8, E1/2, E1/2 W1/2	708.5
128	2W	8	W1/2	320.0
128	2W	17	W1/2	320.0
125	2W	18	Lots 1-8, E1/2, E1/2 W1/2	708.2
128	2W	21	S1/2 SE1/4	80.0
128	2W	22	S1/2 S1/2	160.0
128	2W	23	S1/2 S1/2	160.0
128	2W	26	ALL	640.0
128	2W	27	ALL	640.0
28	2W	28	E1/2	320.0
2S	2W	33	N1/2 NE1/4	80.0
2S	2W	34	N1/2 N1/2	160.0
2S	2W	35	N1/2 N1/2	160.0
	19.1		2-6 Total	18,854.0

TABLE 2.2-1 (Continued)

CTR SELECTED LANDS (OPTION 2)

Township	Township Range Section		Legal Description	Acres
10S	3W	35	E1/2	320.00
11S	1W	6	Lots 1-7, SE1/4 NW1/4, S1/2 NE1/4,	
			E1/2 SW1/4, SE1/4	634.71
11S	1W	7	Lots 1-4, E1/2, E1/2 W1/2	608.56
11S	1W	18	Lots 1-4, E1/2, E1/2 W1/2	611.48
11S	2W	1	Lots 1-4, S1/2, S1/2 N1/2	554.88
11S	2W	2	Lots 1-2, S1/2 NE1/4, SE1/4,	
			E1/2 SW1/4	356.70
11S	2W	11	E1/2, E1/2 W1/2, SW1/4 SW1/4	520.00
11S	2W	12	ALL	640.00
11S	2W	13	ALL	640.00
11S	2W	14	ALL	640.00
11S	2W	15	ALL	640.00
11S	2W	21	NE1/4, N1/2 SE1/4	240.00
11S	2W	22	ALL	640.00
11S	2W	23	ALL	640.00
11S	2W	24	ALL	640.00
11S	2W	25	ALL	640.00
11S	2W	26	ALL	640.00
11S	2W	27	N1/2 N1/2	160.00
11S	2W	35	ALL	640.00
11S	3W	2	Lots 1-2, SE1/4, S1/2 NE1/4	321.13
12S	2W	1	Lots 3-4	80.84
12S	2W	2	Lots 1-4	162.28
12S	2W	6	Lots 10-11, SE1/4 SW1/4	97.24
12S	2W	7	Lots 1-8, E1/2 W1/2, SW1/4 NE1/4,	
			W1/2 SE1/4	508.56
12S	2W	18	Lots 1-8, E1/2 W1/2, W/12 E1/2	548.28
12S	2W	23	SE1/4 SE1/4	40.00
12S	2W	26	E1/2 NE1/4, SE1/4	240.00
12S	2W	35	N1/2 NE1/4	80.00
		•	Total	12,484.66

from 40 acres to 640 acres have been offered. Under the CTR Option 2, 29 parcels totalling 16,260.09 acres have been offered. These parcels are located in Ada, Elmore, Canyon, Gem, and Owyhee Counties, and within the BLM's Cascade, Bruneau, Jarbidge, and Owyhee resource areas. Most of these state-owned offered lands are surrounded by BLM-designated special management lands such as ACECs, WSAs, or along historic landmarks. Legal descriptions, current use, and projected use (post-exchange) for state-offered lands are listed in Table 2.2-2.

2.3 NORTH ITR AND IMPROVED SCR

2.3.1 Selected Lands

Selected lands for the North ITR and Improved SCR alternative would only involve lands within the North ITR due to the fact that the proposed improvements for the SCR are within the existing withdrawal for that range. The land withdrawal for the entire SCR excludes mineral entry. Legal descriptions of the selected lands associated with the North ITR are listed in Table 2.3-1.

2.3.2 Offered Lands

In order to effect the exchange for the selected lands, the State of Idaho has offered state lands throughout southwestern Idaho to the BLM. Under the North ITR and Improved SCR Option 1, 28 parcels totalling 15,620.09 acres ranging from 40 acres to 640 acres have been offered. Under the North ITR and Improved SCR Option 2, 21 parcels totalling 12,760 acres have been offered. These parcels are located in Gem and Owyhee Counties, and within the BLM's Cascade, Bruneau, Jarbidge, and Owyhee resource areas. Most of these state-owned offered lands are surrounded by BLM-designated special management lands such as ACECs, WSAs, or along historic landmarks. Legal descriptions, current use, and projected use (post-exchange) for state-offered lands are listed in Table 2.3-2.

2.4 SOUTH ITR AND IMPROVED SCR

2.4.1 Selected Lands

Selected lands for the South ITR and Improved SCR would only involve lands within the South ITR due to the fact that the proposed improvements for the SCR are within the existing withdrawal for that range. The existing withdrawal excludes mineral entry. Legal descriptions of the selected lands associated with the South ITR are listed in Table 2.4-1.

2.4.2 Offered Lands

In order to effect the exchange for the selected lands, the State of Idaho has offered state lands throughout southwestern Idaho to the BLM. Under the South ITR and Improved SCR alternative, 15 parcels totalling 8,920 acres ranging from 40 acres to 640 acres have been offered. These parcels are located in Gem and Owyhee Counties, and within the BLM's Cascade, Bruneau, Jarbidge, and Owyhee resource areas. Most of these state-owned offered lands are surrounded by BLM-designated special management lands such as ACECs, WSAs, or along historic landmarks. Legal descriptions, current use, and projected use (post-exchange) for state-offered lands are listed in Table 2.4-2.

TABLE 2.2-2
CTR OFFERED LANDS (OPTION 1)

Parcel No.	Location	Resource Area	Acres	Current Use	Proposed Use After Exchange to BLM
1	T6N R1W S34	Cascade	40	Grazing	ACEC
3	T10S R7E S16	Bruneau	640	Grazing	WSA, SRMA
4	T10S R7E S36	Jarbidge	640	Grazing	WSA, SRMA
5	T11S R7E S16	Bruneau	640	Grazing	WSA, SRMA
5	T12S R6E S16	Bruneau	640	Grazing	WSA, SRMA
7	T12S R7E S16	Bruneau	640	Grazing	WSA, SRMA
9	T13S R7E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
10	T13S R7E S36	Jarbidge	640	Grazing	WSA, ACEC, SRMA
11	T14S R8E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
12	T14S R8E S36	Jarbidge	640	Grazing	ACEC, SRMA
14	T15S R1W S16	Owyhee	640	Grazing	WSA
16	T10S R3W S16	Owyhee	560	Grazing	WSA, SRMA
40	T8S R3E S36	Bruneau	640	Grazing	WSA, SRMA
17	T9S R3E S36	Bruneau	640	Grazing	WSA
18	T10S R3E S16	Bruneau	640	Grazing	WSA
19	T10S R3E S36	Bruneau	640	Grazing	WSA
41	T8S R2E S16	Bruneau	640	Grazing	WSA, SRMA
20	T8S R2E S36	Bruneau	640	Grazing	WSA, SRMA
42	T8S R3E S16	Bruneau	640	Grazing	WSA, SRMA
21	T9S R2E S16	Bruneau	640	Grazing	WSA, SRMA
43	T9S R2E S36	Bruneau	638.16	Grazing	WSA, SRMA
14	T9S R3E S16	Bruneau	640	Grazing	WSA, SRMA
26	T2S R7E S16	Bruneau	577.01	Grazing	Oregon National Historic Trail
27	T3S R8E S16	Bruneau	600	Grazing	Oregon National Historic Trail
28	T3S R8E S22	Bruneau	40	Grazing	Oregon National Historic Trail
29	T3S R8E S36	Bruneau	320	Grazing	Oregon National Historic Trail
30	T1S R2W S36	Owyhee	456.18	Grazing	Snake River Birds of Prey Area
31	T3S R1E S16	Bruneau	226.90	Grazing	Snake River Birds of Prey Area
34	T1N R1W S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
35	T2S R1E S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
36	T3S R2E S16	Bruneau	640	Grazing	Snake River Birds of Prey Area
37	T3S R2E S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
38	T3S R1W S36	Owyhee	640	Grazing	Snake River Birds of Prey Area
39	T4S R1E S16	Owyhee	640	Grazing	Snake River Birds of Prey Area
		TOTAL	19,458.25		

TABLE 2.2-2 (Continued)

CTR OFFERED LANDS (OPTION 2)

Parcel No.	Location	Resource Area	Acres	Current Use	Proposed Use After Exchange to BLM
1	T6N R1W S34	Cascade	40	Grazing	ACEC
3	T10S R7E S16	Bruneau	640	Grazing	WSA, SRMA
4	T10S R7E S36	Jarbidge	640	Grazing	WSA, SRMA
5	T11S R7E S16	Bruneau	640	Grazing	WSA, SRMA
6	T12S R6E S16	Bruneau	640	Grazing	WSA, SRMA
7	T12S R7E S16	Bruneau	640	Grazing	WSA, SRMA
9	T13S R7E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
10	T13S R7E S36	Jarbidge	640	Grazing	WSA, ACEC, SRMA
11	T14S R8E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
12	T14S R8E S36	Jarbidge	640	Grazing	ACEC, SRMA
14	T15S R1W S16	Owyhee	640	Grazing	WSA
16	T10S R3W S16	Owyhee	560	Grazing	WSA, SRMA
40	T8S R3E S36	Bruneau	640	Grazing	WSA
17	T9S R3E S36	Bruneau	640	Grazing	WSA
18	T10S R3E S16	Bruneau	640	Grazing	WSA
19	T10S R3E S36	Bruneau	640	Grazing	WSA
41	T8S R2E S16	Bruneau	640	Grazing	WSA, SRMA
20	T8S R2E S36	Bruneau	640	Grazing	WSA, SRMA
42	T8S R3E S16	Bruneau	640	Grazing	WSA, SRMA
21	T9S R2E S16	Bruneau	640	Grazing	WSA, SRMA
44	T9S R3E S16	Bruneau	640	Grazing	WSA, SRMA
26	T2S R7E S16	Bruneau	577.01	Grazing	Oregon National Historic Trail
27	T3S R8E S16	Bruneau	600	Grazing	Oregon National Historic Trail
28	T3S R8E S22	Bruneau	40	Grazing	Oregon National Historic Trail
29	T3S R8E S36	Bruneau	320	Grazing	Oregon National Historic Trail
30	T1S R2W S36	Owyhee	456.18	Grazing	Snake River Birds of Prey Area
31	T3S R1E S16	Bruneau	226.90	Grazing	Snake River Birds of Prey Area
34	T1N R1W S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
35	T2S R1E S36	Bruneau	640	Grazing	Snake River Birds of Prey Area
		TOTAL	16,260.09		

TABLE 2.3-1

NORTH ITR AND IMPROVED SCR SELECTED LANDS (OPTION 1)

Township	Range	Section	Legal Description	Acres
NODTH ITT	ODTION 1			
NORTH ITE	COPTION I			
10S	2W	30	SW1/4	160.00
10S	2W	31	W1/2	320.0
10S	2W	34	SE1/4	160.0
10S	2W	35	SE1/4, E1/2 SW1/4, NW1/4 SW1/4	280.0
108	3W	25	E1/2 SE1/4, SW1/4 SE1/4	120.00
108	3W	35	E1/2	320.00
115	1W	6	Lots 1-7, SE1/4 NW1/4, S1/2 NE1/4,	
			E1/2 SW1/4, SE1/4	634.71
115	1W	7	Lots 1-4, E1/2, E1/2 W1/2	608.50
115	1W	18	Lots 1-4, E1/2, E1/2 W1/2	611.4
115	2W	1	Lots 1-4, S1/2, S1/2 N1/2	554.88
115	2W	2	Lots 1-4, S1/2, S1/2 N1/2	553.0
115	2W	3	Lots 1-2, SE1/4, S1/2 NE1/4	276.03
115	2W	6	Lots 3-13	336.0
115	2W	ò	S1/2 SE1/4	80.0
115	2W	10	NE1/4, S1/2	480.00
115	2W	11	ALL	640.0
115	2W	12	ALL	640.0
115	2W	13	ALL	640.0
115	2W	14	ALL	640.0
115	2W	15	ALL	640.0
115	2W	21	NE1/4, N1/2 SE1/4	240.0
115	2W	22	ALL	640.0
115	2W	23	ALL	640.0
115	2W	24	ALL	640.0
115	2W	25	ALL	640.0
115	2W	26	ALL	640.0
115	2W	27	N1/2 N1/2	160.0
115	2W	35	ALL	640.0
115	3W	1	Lots 1-4, S1/2, S1/2 N1/2	641.0
115	3W	2	Lots 1-2, SE1/4, S1/2 NE1/4	321.1
12S	2W	1	Lots 3-4	80.8
12S	2W	2	Lots 1-4	162.2
			Total	14,139.9

TABLE 2.3-1 (Continued)

NORTH ITR AND IMPROVED SCR SELECTED LANDS (OPTION 2)

Township	Range	Section	Legal Description	Acres
NORTH ITR	OPTION 2			
10S	3W	35	E1/2	320.00
11S	1W	6	Lots 1-7, SE1/4 NW1/4, S1/2	
			E1/2 SW1/4, SE1/4	634.71
11S	1W	7	Lots 1-4, E1/2, E1/2 W1/2	608.56
11S	1W	18	Lots 1-4, E1/2, E1/2 W1/2	611.48
11S	2W	1	Lots 1-4, S1/2, S1/2 N1/2	554.88
11S	2W	2	Lots 1-2, S1/2 NE1/4, SE1/4,	
			E1/2 SW1/4	356.70
118	2W	11	E1/2, E1/2 W1/2, SW1/4 SW1/4	520.00
118	2W	12	ALL	640.00
11S	2W	13	ALL	640.00
11S	2W	14	ALL	640.00
11S	2W	15	ALL	640.00
11S	2W	21	NE1/4, N1/2 SE1/4	240.00
118	2W	22	ALL	640.00
11S	2W	23	ALL	640.00
11S	2W	24	ALL	640.00
11S	2W	25	ALL	640.00
11S	2W	26	ALL	640.00
11S	2W	27	N1/2 N1/2	160.00
11S	2W	35	ALL	640.00
11S	3W	2	Lots 1-2, SE1/4, S1/2 NE1/4	321.13
12S	2W	1	Lots 3-4	80.84
12S	2W	2	Lots 1-4	162.28
			Total	10,970.58

TABLE 2.3-2

NORTH ITR AND IMPROVED SCR OFFERED LANDS (OPTION 1)

Parcel No.	Location	Resource Area	Acres	Current Use	Proposed Use After Exchange to BLM
1	T6N R1W S34	Cascade	40	Grazing	ACEC
3	T10S R7E S16	Bruneau	640	Grazing	WSA, SRMA, W&S
4	T10S R7E S36	Jarbidge	640	Grazing	WSA, SRMA, W&S
5	T11S R7E S16	Bruneau	640	Grazing	WSA, SRMA, W&S
5	T12S R6E S16	Bruneau	640	Grazing	WSA, SRMA, W&S
7	T12S R7E S16	Bruneau	640	Grazing	WSA, SRMA, W&S
)	T13S R7E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA, W&S
10	T13S R7E S36	Jarbidge	640	Grazing	WSA, ACEC, SRMA, W&S
1	T14S R8E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA, W&S
12	T14S R8E S36	Jarbidge	640	Grazing	ACEC, SRMA
4	T15S R1W S16	Owyhee	640	Grazing	WSA
.6	T10S R3W S16	Owyhee	560	Grazing	WSA, SRMA
10	T8S R3E S36	Bruneau	640	Grazing	WSA
17	T9S R3E S36	Bruneau	640	Grazing	WSA
18	T10S R3E S16	Bruneau	640	Grazing	WSA
19	T10S R3E S36	Bruneau	640	Grazing	WSA
41	T8S R2E S16	Bruneau	640	Grazing	WSA, SRMA
20	T8S R2E S36	Bruneau	640	Grazing	WSA, SRMA
12	T8S R3E S16	Bruneau	640	Grazing	WSA, SRMA
21	T9S R2E S16	Bruneau	640	Grazing	WSA, SRMA
14	T9S R3E S16	Bruneau	640	Grazing	WSA, SRMA
26	T2S R7E S16	Bruneau	577.01	Grazing	Oregon National Historic Trail
27	T3S R8E S16	Bruneau	600	Grazing	Oregon National Historic Trail
28	T3S R8E S22	Bruneau	40	Grazing	Oregon National Historic Trail
29	T3S R8E S36	Bruneau	320	Grazing	Oregon National Historic Trail
		TOTAL	14,297.01		

TABLE 2.3-2 (Continued)

NORTH ITR AND IMPROVED SCR OFFERED LANDS (OPTION 2)

Parcel No.	Location	Resource Area	Acres	Current Use	Proposed Use After Exchange to BLM	
1	T6N R1W S34	Cascade	40	Grazing	ACEC	
3	T10S R7E S16	Bruneau	640	Grazing	WSA, SRMA	
4	T10S R7E S36	Jarbidge	640	Grazing	WSA, SRMA	
5	T11S R7E S16	Bruneau	640	Grazing	WSA, SRMA	
5	T12S R6E S16	Bruneau	640	Grazing	WSA, SRMA	
7	T12S R7E S16	Bruneau	640	Grazing	WSA, SRMA	
9	T13S R7E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA	
10	T13S R7E S36	Jarbidge	640	Grazing	WSA, ACEC, SRMA	
11	T14S R8E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA	
12	T14S R8E S36	Jarbidge	640	Grazing	ACEC, SRMA	
14	T15S R1W S16	Owyhee	640	Grazing	WSA	
16	T10S R3W S16	Owyhee	560	Grazing	WSA, SRMA	
40	T8S R3E S36	Bruneau	640	Grazing	WSA	
17	T9S R3E S36	Bruneau	640	Grazing	WSA	
18	T10S R3E S16	Bruneau	640	Grazing	WSA	
19	T10S R3E S36	Bruneau	640	Grazing	WSA	
41	T8S R2E S16	Bruneau	640	Grazing	WSA, SRMA	
20	T8S R2E S36	Bruneau	640	Grazing	WSA, SRMA	
12	T8S R3E S16	Bruneau	640	Grazing	WSA, SRMA	
21	T9S R2E S16	Bruneau	640	Grazing	WSA, SRMA	
14	T9S R3E S16	Bruneau	640	Grazing	WSA, SRMA	
		TOTAL	12,760			

TABLE 2.4-1
SOUTH ITR AND IMPROVED SCR SELECTED LANDS

Township	Range	Section	Legal Description		Acres
SOUTH ITR					
14S	3W	19	Lots 3-4, E1/2 SW1/4		169.88
14S	3W	30	Lots 1-4, E1/2 W1/2		339.12
14S	3W	31	Lots 1-2, E1/2 NW1/4		169.35
14S	4W	23	S1/2		320.00
14S	4W	24	S1/2		320.00
14S	4W	25	ALL		640.00
14S	4W	26	ALL		640.00
14S	4W	35	N1/2		320.00
15S	3W	26	S1/2 N1/2, S1/2		480.00
15S	3W	27	S1/2 N1/2, S1/2		480.00
15S	3W	28	S1/2 N1/2, S1/2		480.00
15S	3W	33	ALL		640.00
15S	3W	34	ALL		640.00
15S	3W	35	ALL		640.00
16S	3W	3	N1/2		320.00
16S	3W	4	N1/2		320.00
				Total	6,918.3

TABLE 2.4-2
SOUTH ITR AND IMPROVED SCR OFFERED LANDS

Parcel No.	Location	Resource Area	Acres	Current Use	Proposed Use After Exchange to BLM
1	T6N R1W S34	Cascade	40	Grazing	ACEC
3	T10S R7E S16	Bruneau	640	Grazing	WSA, SRMA
4	T10S R7E S36	Jarbidge	640	Grazing	WSA, SRMA
5	T11S R7E S16	Bruneau	640	Grazing	WSA, SRMA
6	T12S R6E S16	Bruneau	640	Grazing	WSA, SRMA
7	T12S R7E S16	Bruneau	640	Grazing	WSA, SRMA
9	T13S R7E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
10	T13S R7E S36	Jarbidge	640	Grazing	WSA, ACEC, SRMA
11	T14S R8E S16	Jarbidge	640	Grazing	WSA, ACEC, SRMA
12	T14S R8E S36	Jarbidge	640	Grazing	ACEC, SRMA
14	T15S R1W S16	Owyhee	640	Grazing	WSA
16	T10S R3W S16	Owyhee	560	Grazing	WSA, SRMA
17	T9S R3E S36	Bruneau	640	Grazing	WSA
18	T10S R3E S16	Bruneau	640	Grazing	WSA
19	T10S R3E S36	Bruneau	640	Grazing	WSA
		TOTAL	8,920		

3.0 GEOLOGY, MINERALS, AND MINERAL POTENTIAL

Mineral resources are classified as locatable, leasable, and saleable. Locatable minerals are considered valuable and are open to exploration and purchase. Minerals within this category include precious metals, base metals, refractory metals, and by special enactment, decorative stone, and saline deposits. Leasable minerals of primary importance in Owyhee County include oil, gas, and geothermal resources. These resources can only be acquired by lease. Saleable minerals include sand, gravel, common building stone, limestone, pumice, pumicite, and cinders. Mineral resources are regulated under the Mining Law of 1872, Mineral Leasing Act of 1920, and Common Varieties Act of 1955.

Mineral potential within an area is classified as low, moderate, high, or unknown, as defined in BLM Manual 3031, and reflects the definitions utilized by the U.S. Geological Survey and BOM for studies of mineral resources potential. Low potential is assigned to areas where geologic characteristics define an environment in which the existence of resources is unlikely. This category includes areas of scattered, insignificantly mineralized rock as well as areas with few or no indications of mineralization. Areas of moderate potential reflect a geologic environment that is favorable for resource occurrence and accumulation based on interpretations of data that indicate a reasonable chance of accumulation, and where application of genetic and (or) occurrence models indicate favorable ground. Areas of high potential indicate a geologic environment that is favorable for resource occurrence, and data and modelling show a high degree of likelihood for accumulation and concentration. Assignment of this category also requires knowledge that mineral-forming processes have been active in at least part of the area. Areas lacking adequate geologic information for assessment are assigned unknown potential. However, it should be noted that these potential ratings relate to discovery potential and not the economic feasibility of mining any particular resource.

Mineral potentials are usually assigned one of the following confidence levels:

- A: Available information is not adequate for determination of the level of mineral resource potential.
- B: Available information suggests the level of mineral resource potential.
- C: Available information gives a good indication of the level of mineral resource potential.
- D: Available information clearly defines the level of mineral resource potential.

The leasing policy for oil and gas exploration on federal lands utilizes a system of land categorization developed to protect natural and human resources without hindering oil and gas exploration. Leasing categories include the following:

- (1) open, with standard stipulations (Category 1);
- (2) open, with special stipulations (Category 2);
- (3) open, with no surface occupancy (Category 3); and
- (4) closed or suspended to leasing (Category 4).

Much of southwestern Owyhee County is open for oil and gas lease and well over 60 percent is listed as Category 1 by BLM. In the past, oil and gas exploration has been minimal with a few test holes drilled within the region. Based on the limited level of exploration, the region has an overall unknown potential for an oil or gas discovery. As of November 1992, there were no active oil or gas leases in or adjacent to the selected lands associated with any of the range alternatives.

3.1 INFORMATION SOURCES

Information sources for this report (see Section 6.0, References) include U.S. Geological Survey (USGS) and BOM mineral resources studies for the WSAs in the Owyhee Uplands and surrounding areas to the east, BLM resource management plans and EISs, a BOM mineral assessment (Appendix A), and previous Air Force EISs concerning the region. These existing reports literally surround the state-proposed range and alternatives.

These assessments provide detailed analysis of areas that encompass, are in close proximity to, or abut selected or offered lands involved in the proposed land exchanges. These analyses adequately characterize the mineral potential of these lands and, along with the BOM report specifically generated for this proposed land exchange, satisfy the requirements of FLPMA and NEPA. Secondary sources of data included BLM resource management plans and EISs, and EISs analyzing Air Force activities in the state of Idaho. Overall, these documents contained summaries of the same information as provided in the USGS and BOM mineral assessment reports.

Much of the information provided within this document is summarized from USGS and BOM mineral assessment reports concerning WSAs within and adjacent to the selected and offered lands. Each of these detailed assessments included a literature and record search, research into the mining and exploration history of the area encompassing each WSA studied, geologic mapping, geochemical stream sediment sampling, petrographic and geochemical analysis of rock samples, and a review of existing geophysical data. Furthermore, data from these and other studies were summarized in the *Owyhee Canyonlands Wilderness Final EIS* (BLM 1989a) which covers the entire Owyhee Uplands area.

3.2 GEOLOGY, MINERALS, AND MINERAL POTENTIAL OF INVOLVED LANDS

3.2.1 ITR

3.2.1.1 Selected Lands

Option 1

Selected lands for the ITR are located within the Owyhee Plateau subprovince of the Columbia Intermontane geologic province (formerly known as the Owyhee volcanic field). The area is informally referred to as the Owyhee Uplands. The uplands are generally characterized by thick, flat-lying sequences of Miocene rhyolitic ash-flow tuffs that are overlain by basalt flows (Ekren et al. 1982). Figures 3.2-1 and 3.2-2 show the patterning of the geology within and near the target areas for the North ITR and South ITR. These target areas encompass all selected lands and also include existing state-owned lands and some private lands (360 acres) in the North ITR. Unexposed basement rocks are inferred to be Mesozoic intrusive and metamorphic rocks similar to those that crop out to the north in the Owyhee Mountains (Ekren et al. 1982). The rhyolites erupted from two volcanic centers during Miocene time; approximately 13.8 to 10 million years ago and 9.7 to 9.4 million years ago. The older sequence erupted from the Juniper Mountain Volcanic Center and is defined as compound cooling units of welded rhyolitic tuffs. The Tuffs of Little Jacks Creek (Miocene), a series of simple cooling units of very densely welded, flow-layered rhyolitic tuffs, overlie the Juniper Mountain tuffs. Geologic features in the Pole Creek area indicate that the region is a collapsed caldera. Minor et al. (1987) interpreted the ash-flow tuffs and overlying units as part of a post-collapse sequence that has filled and buried most of the original caldera.

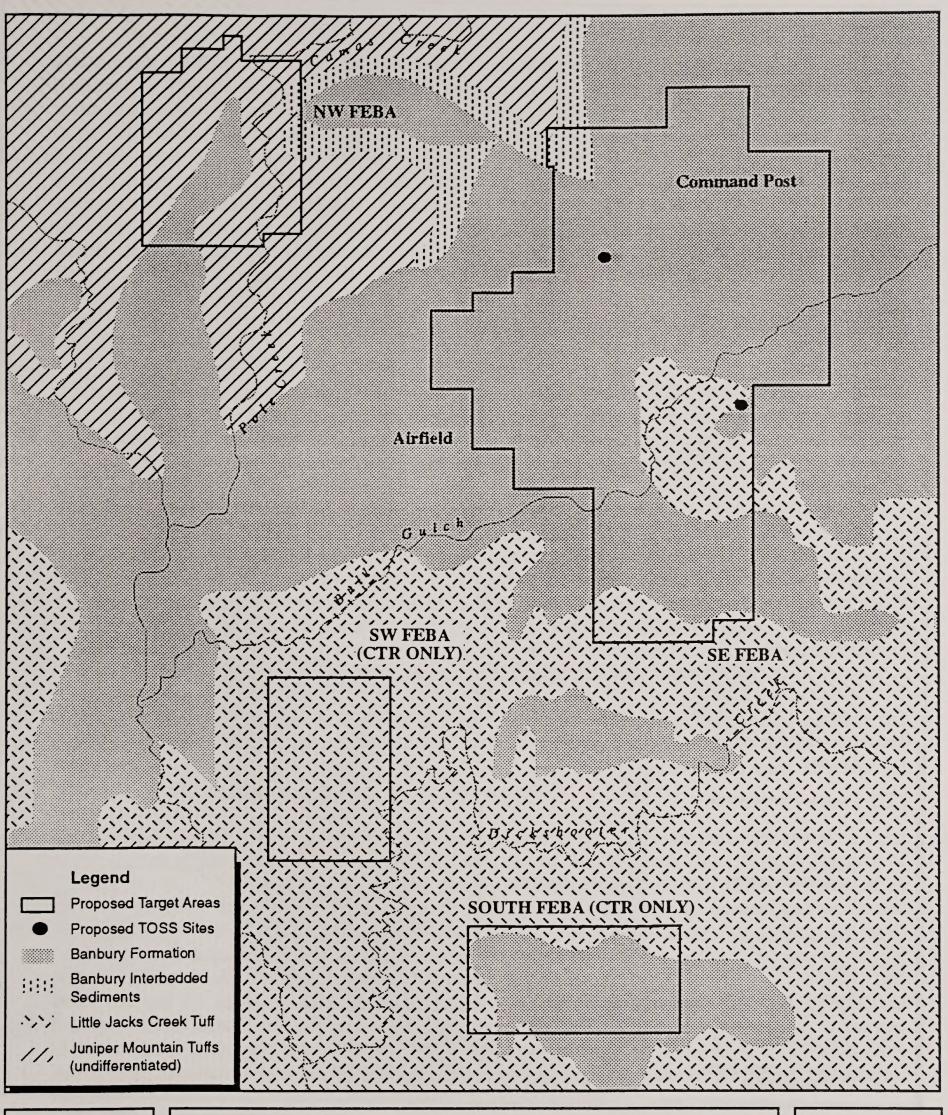
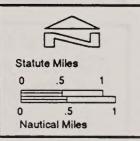
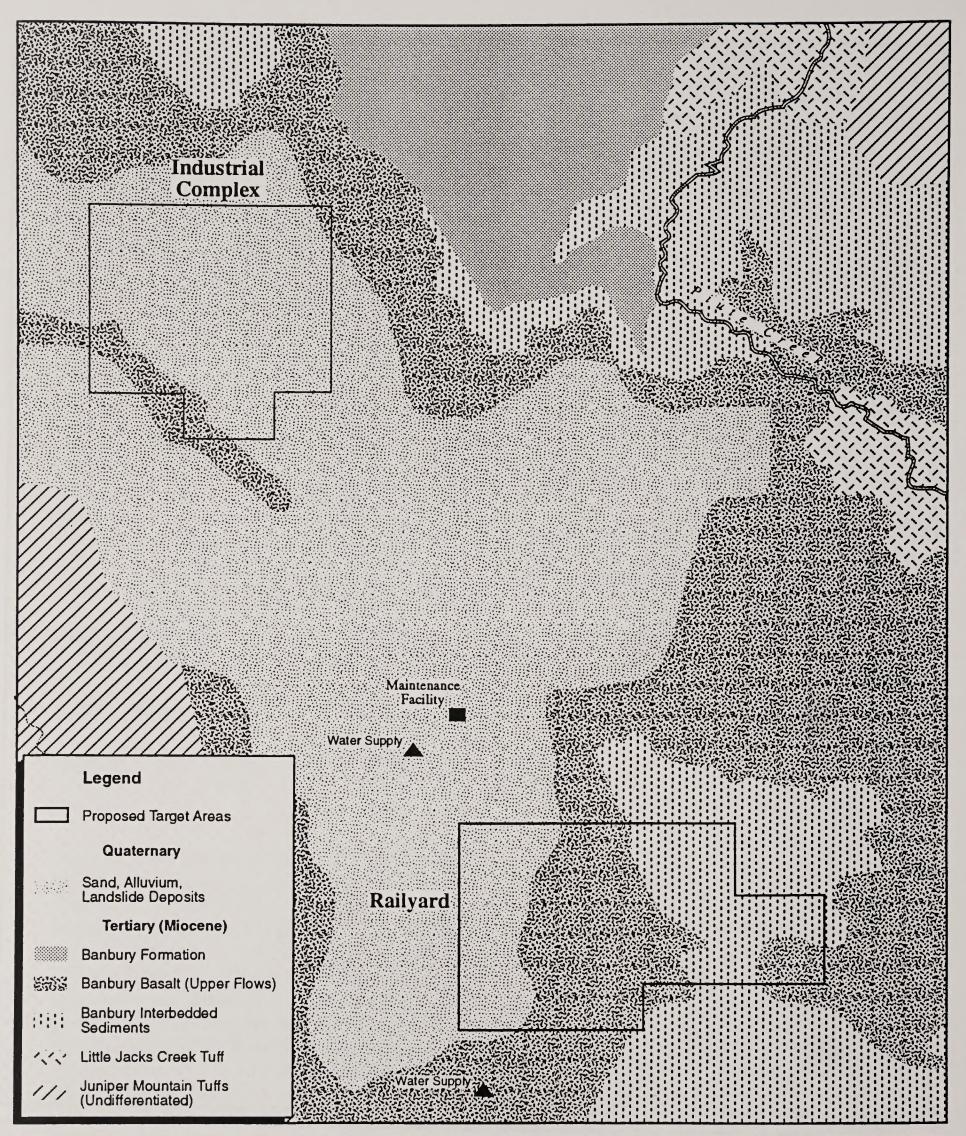




Figure 3.2-1
GEOLOGY OF NORTH ITR AND CTR TARGET AREAS





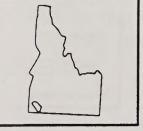
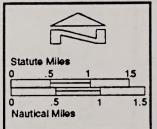


Figure 3.2-2
GEOLOGY OF SOUTH ITR TARGET AREAS



Many of the ash-flow tuffs within both rhyolitic sequences display lava-like features and are now being classified as rhyolite flows. The rhyolites are overlain by olivine basalt flows and interbedded sedimentary units of the Banbury Formation. Sedimentary units within the Banbury consist of a layer of poorly consolidated sediments and silicic ash that separate the older rhyolitic sequences from the overlying cap of basalt flows. These sediments consist of basalt clasts, tuffaceous sand and gravel, and conglomerates. It also includes vitric silicic ash, local flat-lying deposits of lacustrine diatomite and siltstone, and a few, thin, discontinuous basalt flows. The overlying basalt flows are thin, mesa-forming units that were extruded approximately 10.5 to 8 million years ago from volcanic vents that are widely distributed across the Owyhee Uplands (Ekren et al. 1982). Recently deposited alluvium and colluvium formed a thin veneer over the Banbury and older rhyolitic units in many areas of the Owyhee Uplands. A prime example of this is found near the selected lands for the Industrial Complex target area in the South ITR where an extensive deposit of eolian (wind-blown) sand and silt cover the Banbury (Ekren et al. 1982).

Faults in the area are generally northwest-trending, high-angle (normal) faults with small displacement. Most of the episodes of basalt extrusion post-date faulting evidenced by the formation of shallow graben-like depressions where the basalt covered fault escarpments (Ekren et al. 1982). The majority of northwest-trending fault grabens occur to the east and north of the selected lands for the ITR.

The lands around the ITR selected lands within the proposed target areas contain only one locality where mineral resources are actively being pursued; however, this locality is not within the selected lands for the range. Dickshooter Mine (Figure 3.2-2), located just to the south of the North ITR, is currently held under active claim for diatomite by Grefco Inc. According to the most recent claim records (November 17, 1992), this approximately 160-acre site is covered with 21 placer (surface mining) claims and 9 millsite claims. Placer claims are staked on ground that includes valuable deposits that have been concentrated in earth, sand, or gravel. Therefore, this type of claim is associated with surface mining operations. Millsite claims identify areas where mine tailings will be accumulated.

At the present time, workings at Dickshooter Mine consist of numerous pits as well as backhoe and bulldozer trenches. The deposit was first located in the mid 1930s when a "few" tons of diatomite were removed and processed at a facility in Grand View, Idaho. The material was used as a cement admixture, polish, insulation, and filter media (Powers 1947).

The diatomite deposit, part of the interbedded Banbury sediments, occurs in a lenticular erosional basin in the surface of the Little Jacks Creek tuff and overlain by 3 to 6 meters (m) (10 to 20 feet (ft)) of Banbury basalt. This deposit of freshwater diatoms is approximately 610 m (2,000 ft) long in an east-west direction, and is about 305 m (1,000 ft) wide by 46 m (150 ft) thick. It contains an estimated 3.81 million wet metric ton (mt) [4.2 million short ton (st)], or approximately 1.81 million dry mt (2 million st) of high-purity material (Stanely 1964). Several samples taken by the BOM during mineral resource studies of adjacent WSAs placed the diatomite in the highest (best) industrial uses category. Due to its size and the absence of ash and clay impurities (common in diatomite), this deposit was, and probably still is, Idaho's best diatomite reserve (Sawlan et al. 1987). Grefco recently removed a few tons of diatomite for testing and submitted three mine-access road alternatives to the BLM for consideration. All of these alternatives incorporate existing roads that transect at least one of the sections of selected lands for the North ITR (Figure 3.2-3).

Based on mineral assessments conducted in the Owyhee Uplands by the USGS and the BOM in the mid-1980s (Ach et al. 1986; Goeldner et al. 1986; Minor et al. 1986; Foord et al. 1987; McIntyre et al. 1987; Minor et al. 1987; Sawlan et al. 1987), the region was rated as having low potential for epithermal gold

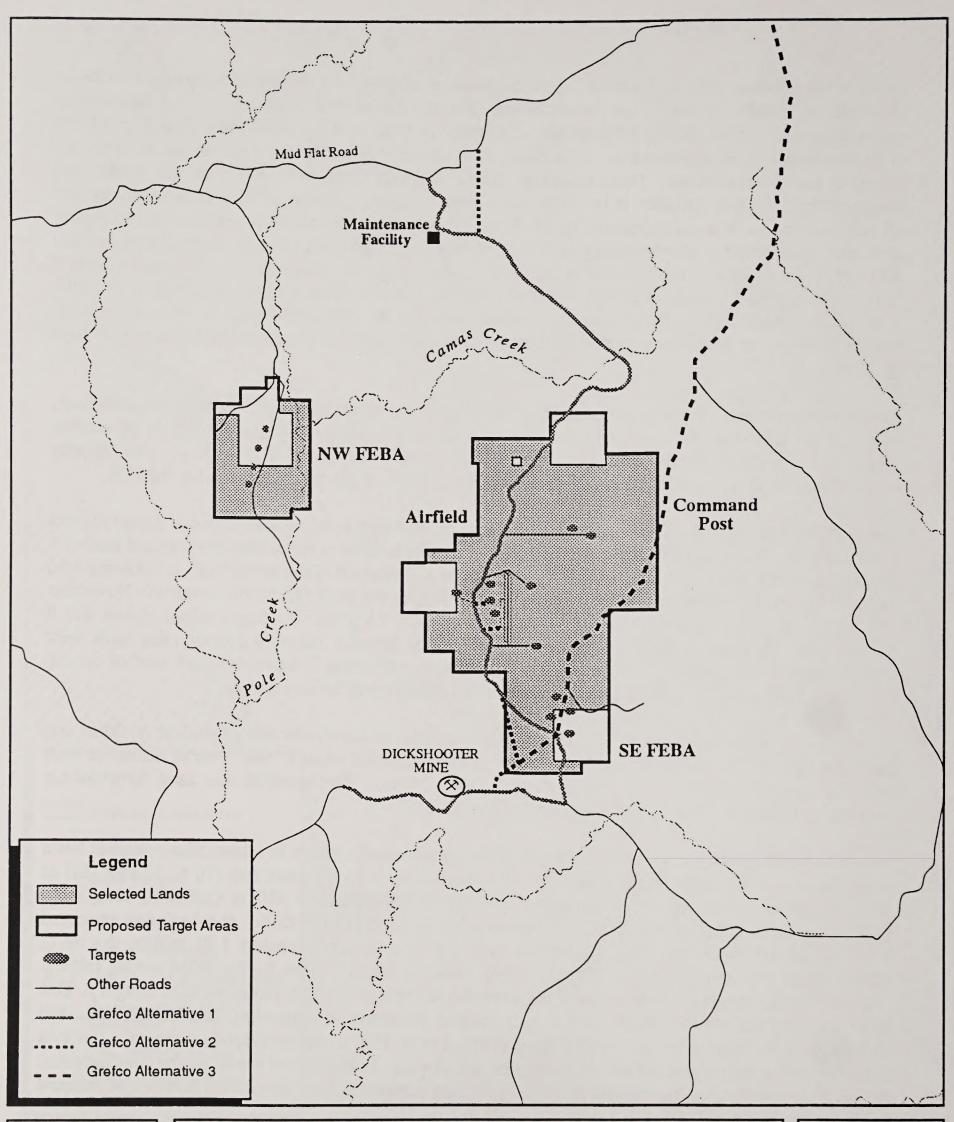
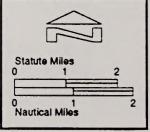




Figure 3.2-3

ROAD ALTERNATIVES PROPOSED BY GREFCO FOR THE DICKSHOOTER MINE



and silver, lead, zinc, tin, and uranium resources in the underlying rhyolitic formations. In 1989, the BLM conducted a 60-day public review of these assessments. Based on information provided from the public, the USGS regionally upgraded mineral potential ratings from low to moderate for low-grade epithermal (low-temperature hydrothermal solutions) gold and silver resources (BLM, 1991).

Major rivers and creeks throughout the uplands contain small amounts of placer gold with low potential for recreational panning and dredging. An exception is Upper Deep Creek which has been found to contain higher concentrations of gold than normal for the area and is rated as having moderate potential (Ach et al. 1986; Goeldner et al. 1986; Minor and others 1986; Foord et al. 1987; McIntyre et al. 1987; Minor et al. 1987; Sawlan et al. 1987). Studies by Minor and others (1987) suggest that this area is part of a caldera, a volcanic feature known to be present in areas of epithermal alteration. Gold found in Upper Deep Creek has all the characteristics of being derived from a fairly close source and may have come from alteration associated with this caldera. Samples taken from Upper Deep Creek for analysis found gold in concentrations up to .0068 troy ounces per cubic yard with values up to \$2.72 per cubic yard at \$400 per troy ounce (Minor et al. 1987). These values are higher than the average (\$0.02 per cubic yard) for the Owyhee Uplands. However, the volume of sand and gravel host rock is insufficient to be economically feasible for a large-scale mining operation (Minor et al. 1987). Subsequently, the area may have the resources to support recreational placer gold mining. Due to its proximity, Pole Creek may also contain placer gold occurrences similar to Upper Deep Creek. Under Option 1 for ITR selected lands, Pole Creek flows within the eastern part of the NW FEBA target area and within the selected lands. Gold recovered from Upper Deep Creek exhibits characteristics such as angularity and brightness that suggest that the source is nearby and may have traveled a short distance (Minor et al. 1987). Based on the lack of gold in WSA mineral assessments conducted to the north of the Upper Deep Creek WSA, Minor et al. (1987) indicated the gold source may be located within the north or northeast sections of the Upper Deep Creek WSA. This possible source area is just to the northwest of the selected lands for the NW FEBA.

The only other evidence of mineral resource activity in the immediate area of the ITR are two small prospects west of the South ITR target areas and selected lands. These prospects contain jasper, agate, and common opal in altered rhyolite tuff that is exposed along the Little Owyhee and Owyhee rivers. These prospects also may have been excavated for precious metals (Ach et al. 1986; Foord et al. 1987).

Other mineral resources which may exist within the Owyhee Uplands but have been given a low potential rating include oil, gas, geothermal fluids, and zeolites and semi-precious stone (jasper, agate, and common opal) associated with the alteration of sediments and tuffs (Ach et al. 1986; Foord et al. 1987; Sawlan et al. 1987). Both of these geologic deposits are of primary interest to hobbyists and have little commercial value (BLM 1989a).

Option 2

ITR Option 2 remains in the same geologic terrain as Option 1. However, the Pole Creek area with the low potential for recreational gold panning and dredging is not included in the selected lands under Option 2.

3.2.1.2 Offered Lands

Option 1

With the exception of parcels 1, and 26 through 52, all offered lands lie within geologic terrain similar to that described for the selected lands of the ITR (Malde et al. 1963; Ekren et al. 1981; Jenks and

Bonnichsen 1990; Kauffman and Bonnichsen 1990). For these locations, the geology is dominantly rhyolitic volcanic rocks that are overlain by basaltic lava flows. Some locations may include exposures of the lacustrine interbeds of the Banbury Basalt, alluvial sands and gravel, or deposits of eolian (wind blown) sands. For these parcels, mineral resources and potential for mineral resources are also similar to those of the selected lands of the ITR (Goeldner et al. 1986; Ach et al. 1986; Sawlan et al. 1987; Foord et al. 1987; BLM 1989b).

Mineral resources identified in the region surrounding the offered parcels to the south of the SCR include a few uranium prospects located in the sediments of the Glenns Ferry Formation. Most of the identified resources and mineral activity occur within the canyons of the Bruneau and Jarbidge Rivers, where these river canyons cut through the unmineralized Banbury Basalt to expose older, more mineralized rhyolitic rocks underlying them. Resources include gem-quality "Bruneau Jasper" and other collectable semi-precious stones, limestone, zeolite, and placer gold. Several geothermal sites occur along and near these river canyons. The parcels in this area are predominately covered by basalt; the mineral resource potential for all metals and most industrial minerals is considered low. Lands in this area have been classified as prospectively valuable for geothermal resources (low- to moderate-temperature systems), and oil and gas (BLM 1984a; BLM 1984b).

Parcels 26-31 and 34-52 are within the western Snake River Plain. The geology of these locations is dominated by the lacustrine sedimentary units of the Idaho Group (Kimmel 1982; Ekren et al. 1981). Important formations within this group include (in descending stratigraphic order): the Glenns Ferry, Banbury Basalt, Chalk Hills, and Poison Creek. Recently deposited sands and gravel, and areally restricted basaltic lava flows cover these lacustrine deposits within a few of the offered lands.

Mineral resources in the Snake River Plain include sand, gravel, clay, and cinders. Fine placer gold has also been sporadically recovered (BLM 1979). The USGS classifies the area as prospectively valuable for oil, gas, and geothermal development. The Castle Creek Known Geothermal Resource Area (KGRA) is located just to the south of parcels 31 and 35-39. Parcel 52 is located within the Castle Creek KGRA, although there are no geothermal leases on this parcel. Parcels 26-29 are also located within a geothermally active area; at least five geothermal springs are located in and around these parcels (Hustedde et al. 1981).

Option 2

Offered lands in ITR Option 2 lie within the same geologic region as Option 1. Although Option 2 excludes parcels 45 through 52 (refer to Table 2.1-2), the geology, minerals, and mineral potential for these lands are the same as described for the ITR Option 1 (Section 3.2.1.2).

3.3.1 CTR

3.3.1.1 Selected Lands

Option 1

The CTR is situated within the same geologic terrain as the ITR and is characterized by thick, flat-lying sequences of Miocene rhyolites overlain by basalt flows and interbedded sediments of the Banbury Formation.

Mineral resources within the northern half of the CTR are the same as those described for the North ITR due to the overlap of these two range alternatives. The diatomite deposit under active claim by Grefco,

Inc. is located under the proposed restricted airspace of the CTR, but does not fall within any of the target areas or selected lands they include. With the exception of epithermal gold and silver sources, potential for metallic minerals is considered low throughout the southern half of the CTR (BLM 1989b). As discussed for the selected lands of the ITR, in 1989 the USGS regionally upgraded gold and silver source potential from low to moderate. The likelihood of petroleum resources is low to nonexistent, although the BLM considered that a potential for drilling exists in the plateaus in and around the southwest section of the CTR.

Option 2

CTR Option 2 remains in the same geologic terrain as Option 1. However, the Pole Creek area, with the low potential for recreational panning and dredging, is not included in the selected lands under Option 2.

3.3.1.2 Offered Lands

Option 1

Offered lands associated with the exchange for the CTR lie within the same geologic terrain as described for the ITR. The geology, minerals, and mineral potential for these lands are the same as described for the ITR (Section 3.2.1.2). Offered lands for the CTR alternative Option 1 include parcels 1, 3-7, 9-12, 14, 16-21, 26-31, and 34-44 (refer to Table 2.2-2).

Option 2

Offered lands associated with the exchange for the CTR Option 2 lie within the same geologic region as ITR, although Option 2 excludes parcels 43 and 36-39 (refer to Table 2.2-2). The geology, minerals, and mineral potential for these lands are the same as described for the ITR (Section 3.2.1.2).

3.4.1 North ITR and Improved SCR

3.4.1.1 Selected Lands

Option 1

The SCR is an existing range that is managed under an Air Force land withdrawal that includes withdrawal from mineral entry. Improvements to the range will not require land to be exchanged. Thus, the only selected lands involved under this alternative are those previously described for the North ITR in Section 3.2.1.1.

Option 2

The North ITR for Option 2 remains in the same geologic terrain as Option 1. However, the Pole Creek area, with the low potential for recreational panning and dredging, is not included in Option 2. The Improved SCR includes no WSA lands and is already withdrawn from mineral entry, so Option 2 does not apply to this component of the alternative.

3.4.1.2 Offered Lands

Option 1

The general geology of the offered lands associated with the North ITR and Improved SCR alternative is the same as that described for the ITR; thus, the geology, minerals, and mineral potential for these lands are the same as described for the ITR (Section 3.2.1.2). The offered lands under this option include parcels 1, 3-7, 9-12, 14, 16-21, 26-29, 40-42, and 44 (refer to Table 2.3-2).

Option 2

The general geology of the offered lands associated with the North ITR and Improved SCR alternative under Option 2 is the same as that described for the ITR, although Option 2 excludes parcels 26-29 (refer to Table 2.3-2). The geology, minerals, and mineral potential for these lands are the same as described for the ITR (Section 3.2.1.2).

3.5.1 South ITR and Improved SCR

3.5.1.1 Selected Lands

The SCR is an existing range that is managed under an Air Force land withdrawal that includes withdrawal from mineral entry. Improvements to the range will not require land to be exchanged. Thus, the only selected lands involved under this alternative are those previously described for the South ITR in Section 3.2.1.1.

3.5.1.2 Offered Lands

Parcels included in this alternative are 1, 3-7, 9-12, 14, and 16-19 (refer to Table 2.4-2). The general geology of the offered lands associated with the South ITR and Improved SCR alternative is the same as that described for the ITR; subsequently, the geology, minerals, and mineral potential for these lands are the same as described for the ITR (Section 3.2.1.2).

4.0 CLAIMS AND OPERATIONS

4.1 ITR

4.1.1 Selected Lands

No mining claims or operations, mineral leases, identified mineral deposits or oil, gas, or geothermal leases occur within any of the selected lands under this alternative, for either option. As such, the proposed exchange would not involve mineral claims or mining operations. Although not within any of the selected lands for this alternative, the 30 placer and millsite claims associated with the Grefco diatomite deposit are the only existing claims that could potentially be affected by the development and operation of the ITR. The development and use of the ITR would not directly impact the mine site; however, range operations could impact any of the proposed access road alternatives for the mine that Grefco has submitted to the BLM for consideration (Figure 3.2-2) (Appendix B). Under the Mining Law of 1872 and FLPMA, the BLM must allow Grefco reasonable access to the mining claims and mining operation, if the mining operation plan and road alternatives are approved by the BLM. Grefco presently accesses the claims at Dickshooter Mine along the roadways that cross the Southeast FEBA and Airfield target areas in the North ITR. This is also the alternative Grefco prefers for ore-hauling access to the mine. It is the shortest route (57 miles) to the diatomite processing facility in Grand View and, therefore, would have the least economic impact on the mining operation. In the official BLM response to Grefco's access road letter, it is made clear that the BLM will require an environmental impact study for the mining operation (Appendix B). Furthermore, the BLM states that it has no intention of approving any access alternative for operation-related activities until Grefco demonstrates a need for such a road by submitting a Plan of Operation and conducting a cumulative environmental impact study of their proposed operation. The State of Idaho and the BLM will, as mandated, provide Grefco reasonable access to its claims for annual maintenance and, when approved by the BLM, will mitigate any potential access road conflicts with the mining operation.

Estimated economic benefits associated with potential development and operation of the mine include: \$22.7 million in direct and indirect total industry output during the 1 year of mine and plant construction; \$7.0 million in annual direct and indirect total industry output for the 20-year mine and plant operation with a cumulative 20-year direct and indirect total industry output of \$140.5 million; 138 direct and indirect jobs with employee compensation of \$4.3 million created during the 1 year of mine and plant construction; and 62 direct and indirect jobs with annual employee compensation of \$1.9 million created by the 20-year mine and plant operation, or a cumulative 20-year employee compensation of \$38.5 million (Appendix A). These figures only include the first 20 years of mining. An additional 20 years of mining and the associated economic benefits are possible, assuming that the remainder of known reserves would be mined at a similar production rate and the market remains strong for this material.

4.1.2 Offered Lands

No mining claims or operations or active oil, gas, or geothermal leases are identified within state-offered parcels, under both options (State of Idaho 1993; Appendix C). Exchanged offered lands would fall under the jurisdiction of the BLM and subsequently the requirements of FLPMA. Mineral resources on those lands would be regulated under the Mining Law of 1872. However, the majority of the offered parcels are within BLM designated Special Category Lands (e.g., WSAs, ACECs, etc.) and would be managed as such by the BLM. Some of the proposed management policies could preclude or limit mining and mineral exploration. The BLM may require a bond to conduct mining and mineral exploration activities within Special Category Lands that do not prohibit these types of activities.

4.2 CTR

4.2.1 Selected Lands

There are no mining claims or operations within the selected lands for the CTR under either option. However, development of the CTR will affect access to the diatomite reserve under development by Grefco. Like the ITR, range development would only affect access to the mine, not the mine site. The requirement to allow access described in Section 4.1.1 above would also apply under this alternative.

4.2.2 Offered Lands

The offered lands contain no mining claims or mining operations under either option. Refer to Section 4.1.2 for further discussion of this data.

4.3 NORTH ITR AND IMPROVED SCR

4.3.1 Selected Lands

No mining claims or mining operations occur within the selected lands for the North ITR under the North ITR and Improved SCR alternative, under both options. The closest claims and/or operations are those under development by Grefco, Inc. just to the south of the North ITR target areas. Potential affects to the mining operation, if realized, are addressed under the ITR alternative (refer to Section 4.1.1).

4.3.2 Offered Lands

The offered lands contain no mining claims or mining operations under either option. Refer to Section 4.1.2 for further discussion of this data.

4.4 SOUTH ITR AND IMPROVED SCR

4.4.1 Selected Lands

No mining claims or mining operations occur within the selected lands for the South ITR under the South ITR and Improved SCR alternative. The closest prospects are those found along the Little Owyhee and Owyhee rivers to the west of the range boundaries (refer to Section 3.5.1). These prospects are primarily of interest to hobbyists (BLM 1989b).

4.4.2 Offered Lands

The offered lands contain no mining claims or mining operations under either option. Refer to Section 4.1.2 for further discussion of this data.

5.0 CONCLUSIONS

No conflicts with mineral resources of any significance are known to occur at this time on selected or offered lands involved in this exchange for the state-proposed air-to-ground training range. Only one area of moderate mineral potential is known to exist within Option 1 selected lands for the ITR, CTR, and North ITR and Improved SCR alternatives. This area is summarized below.

Mineral exploration in the Pole Creek area could result in additional discoveries of recreational placer gold resources and low-grade epithermal gold deposits. To date, no detailed studies have been conducted to specifically assess this potential. The development and use of a state-owned training range is not anticipated to substantially impact the accessibility to any epithermal or recreational-grade placer gold deposits along Pole Creek which extends through the eastern part of the Option 1 selected lands for the NW FEBA target area of the ITR, CTR, or North ITR and Improved SCR alternatives. As part of the exchange process, the State of Idaho would receive all mineral rights on exchanged public lands. It would be in the state's best interest to retain the mineral rights on selected lands, including those of the NW FEBA, to avoid any potential conflicts with the proposed range in the future. This would eliminate approximately 3 of 16 miles of this drainage from access to mining. Given the amount of area affected and the lack of an actual discovery of a mineral source, it is unlikely the establishment of the NW FEBA will adversely affect mining. In addition, it could be possible to permit recreational dredge and placer mining activities along the creek during range inactive periods. Many weekends would be available. The Pole Creek area should be carefully examined for epithermal alteration in any ensuing mineral study that is prepared for land exchange proposals in that area.

Although the Grefco diatomite deposit is not located within selected or offered lands for any of the range alternatives, development and operation of the mine could potentially impact operation of the ITR, CTR, and North ITR and Improved SCR alternatives. The BOM has estimated that the Grefco diatomite deposit would be reasonably economical to operate under current market conditions. The regional input/output analysis (IMPLAN) utilized by the BOM shows that development of the deposit would have a long-term benefit to the economies of Owyhee and Elmore Counties (refer to Section 4.2.1). The most economically desirable proposal for an air-to-ground training range in Owyhee County would be one which allows the training range and diatomite mining to coexist.

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APPENDIX A MINERAL ASSESSMENT REPORT



MINERALS ENVIRONMENTAL DOCUMENT

MINERAL RESOURCE ASSESSMENT OF THE IDAHO TRAINING RANGE ALTERNATIVES, OWYHEE COUNTY, IDAHO

Ву

Michael D. Dunn Western Field Operations Center

U.S. Department of the Interior U.S. Bureau of Mines

January 1993

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

ft	foot	mt/yr	metric ton per year
ha	hectare	st	short ton
kg	kilogram	st/d	short ton per day
km	kilometer	st/yr	short ton per year
m	meter	yd	yard
mt	metric ton	8	percent
mt/d	metric ton per day		



MINERAL RESOURCE ASSESSMENT OF THE IDAHO TRAINING RANGE ALTERNATIVES, OWYHEE COUNTY, IDAHO

By Michael D. Dunn³

EXECUTIVE SUMMARY

The State of Idaho (State) is proposing a land acquisition from the Bureau of Land Management through land exchange. The State's intent is to lease the acquired land to the U.S. Air Force (USAF) as an air-to-ground training range. This study was conducted by the U.S. Bureau of Mines in cooperation with the USAF for inclusion in an Environmental Impact Statement. Its purpose is to provide an overview of the potential and economic significance of mineral resource development on those lands. Four alternatives for the proposed Idaho training range are concentrated in two areas within Owyhee County. Two State proposed ranges are located in the Owyhee Plateau area and two USAF proposed sites are near the USAF's existing Saylor Creek Range. Both areas were assessed for this report.

Only the area of the State's range proposals contains important mineral resources and/or mineral resource potential. In the vicinity of Pole Creek, this area has moderate potential for placer gold suitable for recreational panning, and moderate potential for the discovery of a low-grade epithermal gold deposit. In the vicinity of Dickshooter Creek, this area contains a high-quality diatomite deposit currently under development and patent application. A supporting study involving the generation of a generic diatomite mine/mill model was completed. Estimated results from the model indicate that the Dickshooter diatomite deposit could be reasonably economic to mine.

A regional input-output analysis using IMPLAN concluded that estimated economic benefits to Owyhee and Elmore Counties from mining the diatomite deposit are: \$22.7 million in direct and indirect total industry output during the 1 year of mine and plant construction; \$7.0 million in annual direct and indirect total industry output for the 20-year mine and plant operation, with a cumulative 20-year direct and indirect total industry output of

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\$140.5 million; 138 direct and indirect jobs with employee compensation of \$4.3 million created during the 1 year of mine and plant construction; and 62 direct and indirect jobs with annual employee compensation of \$1.9 million created by the 20-year mine and plant operation, or a cumulative 20-year employee compensation of \$38.5 million. The Bureau recommends that a preferred proposal be formulated which will allow for the existence of training range and the mining of the deposit so that economic benefits from both ventures could be realized by the region.

INTRODUCTION

Purpose

The U.S. Air Force (USAF), in cooperation with the State of Idaho (State), the Bureau of Land Management (BLM), the Federal Aviation Administration, and the U.S. Bureau of Mines (Bureau) is preparing an Environmental Impact Statement (EIS) for a proposal to identify, select, and develop a realistic air-to-ground training range in southwestern Idaho. The purpose of the proposal is to support future training needs of the Composite Wing at Mountain Home Air Force Base, Mountain Home, ID, and the Idaho ANG F-4G "Wild Weasels" at Gowen Field, Boise, ID. Once a site is selected and approved, the process will involve exchange of specific BLM land within that site for an equivalent amount of land offered by the State. The State will then let the USAF use this land for the training range through 10-year lease agreements. BLM will manage the remaining land within the site as a buffer zone, while still allowing some multiple use. Because the Idaho Training Range proposal is primarily a land exchange between BLM and the State, all BLM requirements associated with land exchanges, such as suitability for exchange determinations, environmental assessments, and mineral reports, will be in effect.

The Bureau prepared this report under its cooperating agency agreement with the USAF to ensure that mineral resources and possible impacts to those resources are adequately assessed in the EIS as required by National Environmental Policy Act (NEPA) regulations. Mineral resources are being evaluated because at least one significant mineral deposit, currently under development, occurs within proposed alternatives for the Idaho training range. This report was prepared for incorporation, in part or in total, into the EIS document.

Setting

There are a total of four Idaho training range alternatives, all occurring in two separate areas of Owyhee County, ID. Two alternatives, the State's range proposals, are in the Owyhee Plateau area, centered about 88 km (55 miles) south-southwest of Grand View, ID. The other two alternatives, the USAF's Saylor Creek sites, are near the USAF's existing Saylor Creek Range, centered about 56 km (35 miles) southeast of Bruneau, ID (fig. 1). The area is predominantly Federal land (under BLM management except for the USAF's existing Saylor Creek Range) and contains minor scattered sections and parcels of state and private land. The areas are accessible by dirt roads and jeep trails that can become nearly impassable during inclement weather.

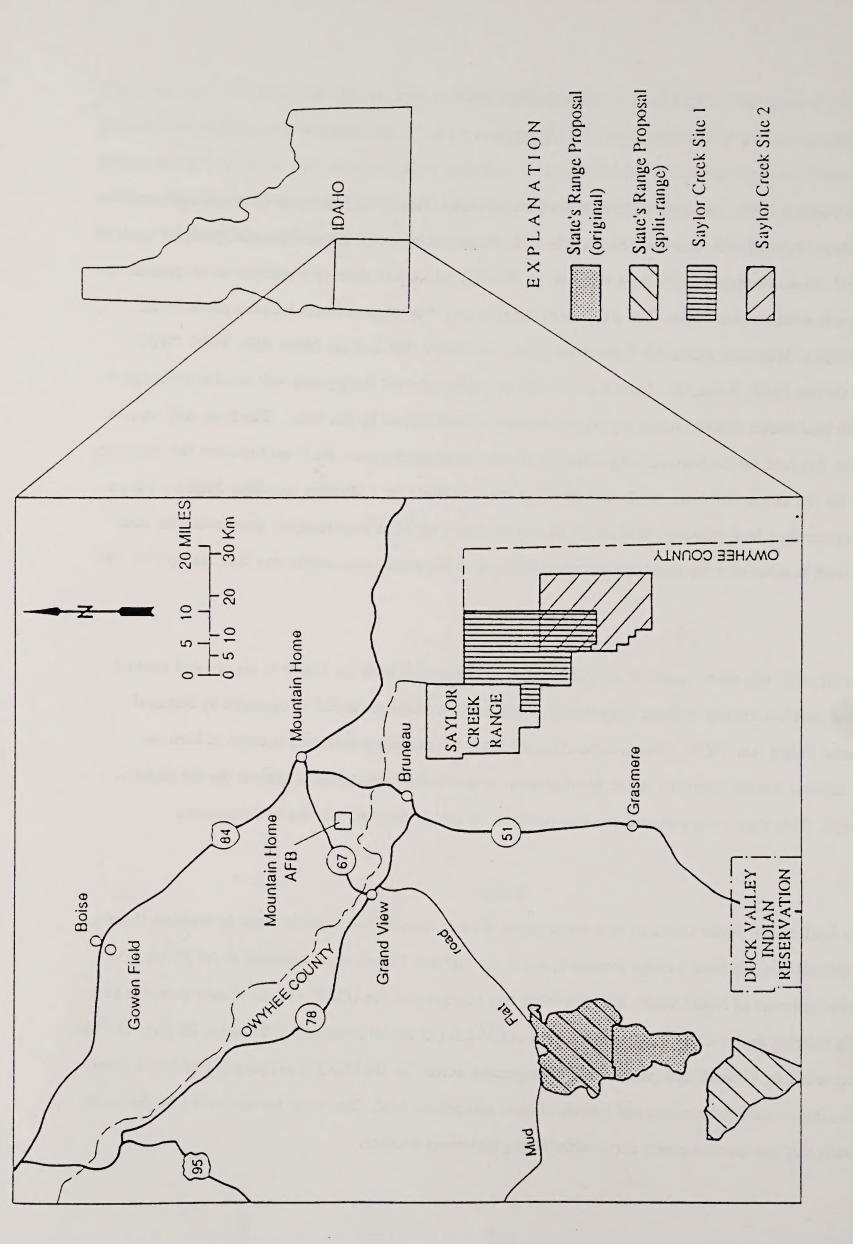


Figure 1.- Location map of the Idaho training range afternatives (boundaries for alternatives provided by SAIC)

The State's two proposals are the original and split-range. The State's original range proposal covers approximately 60,700 ha (150,000 acres) with a 38,800 ha (96,000 acre) northern portion and a 21,900 ha (54,000 acres) southern portion. The split-range proposal consists of a 38,800 ha (96,000 acres) northern portion of the original proposal and a 28,300 ha (70,000 acres) southern area across the Owyhee River. All proposed areas are situated on relatively flat-lying plateaus of the Owyhee Uplands, between 1,525 and 1,830 m (5,000 and 6,000 ft) in elevation, and are void of any deep canyons. The State's range proposals are virtually surrounded by Wilderness Study Areas and wildlife habitat.

The two Saylor Creek site alternatives are Saylor Creek Site 1, with approximately 62,300 ha (154,000 acres) of land east of and adjacent to the currently existing Saylor Creek Range, and Saylor Creek Site 2, with approximately 54,200 ha (134,000 acres) of land. Saylor Creek Site 2 overlaps the southeast corner of Site 1 at its northwest corner. Both sites are situated on a broad north-sloping plateau in the southern part of the Snake River Plain between elevations of 1,525 m (5,000 ft) to the south and 915 m (3,000 ft) to the north.

ACKNOWLEDGMENTS

The author thanks U.S. Bureau of Mines colleagues David Benjamin for his contribution to the mine/mill modeling and costing, and Michael Horn for his regional input/output economic estimates (IMPLAN).⁴ A special thank you goes to David Jenkins and Grefco Inc. for information and cooperation provided to the Bureau.

AFFECTED ENVIRONMENT

Geology

State's Range Proposals

The State's range proposals lie within the Owyhee Plateau subprovince of the Columbia Intermontane geologic province (formerly known as the Owyhee volcanic field). The geology consists of a thick, flat-lying sequence of Miocene rhyolitic ash-flow tuffs and basalt flows with minor interbedded sedimentary rocks. Many of the ash-

⁴U.S. Forest Service economoic impact model.

flow tuffs display lava-like features and are now being classified as rhyolite rather than tuff. The sedimentary rocks are a thin layer of poorly consolidated sediments and silicic ash that separate the rhyolitic rocks from the overlying cap basalts. Unexposed basement rocks are inferred to be Mesozoic intrusive and metamorphic rocks similar to those outcroping to the north in the Owyhee Mountains (5).

Faults in the area are generally northwest-trending high-angle (normal) faults with small displacement. Most of the basalt capping post-dates faulting, but shallow graben-like depressions have formed where the basalt flowed over some of these fault zones (5). Evidence suggests a collapsed caldera exists in the Pole Creek area of the proposals, and that ash-flow tuffs and overlying units are part of a post-collapse sequence that has filled and buried most of the original caldera (10).

Local geology for the State's range proposals is shown in figure 2. The following descriptions are modified from Ekren and others (4). The oldest exposed rocks are a series of Miocene tuff units of the Juniper Mountain Volcanic Center. They are defined as compound cooling units of welded rhyolitic tuffs containing flow-layered features. Many of these tuffs are currently being reclassified as rhyolites. The Tuffs of Little Jacks Creek (Miocene), a series of simple cooling units of very densely welded, flow-layered rhyolitic tuffs, overlie the Juniper Mountain tuffs. These units are also being reclassified as rhyolites. The thin basalt flows and interbedded sediments of the Banbury Formation (Miocene) cover these tuffs. The Banbury Formation has generally been mapped as undifferentiated, but locally two units are mapped separately. These separated units consist of upper basalt flows and interbedded sediments. The upper flow unit consists of one or more mesaforming, thin, basalt flows that have interfingered from widely separated vents. The interbedded sediments unit consists of basalt clasts, tuffaceous sand and gravel, and conglomerates. It also includes vitric silicic ash, local lacustrine diatomite, and a few, thin, discontinuous basalt flows. Quaternary (Recent) sediment deposits consist of windblown sand and silt over the flat mesas, landslide material along deep canyons, and young alluvium in fault-formed grabens. The majority of the area's northwest-trending fault grabens occur to the east and north of the State's original range proposal.

Saylor Creek Sites

⁵Underlined numbers in parentheses refer to items in the list of references at the end of this report.

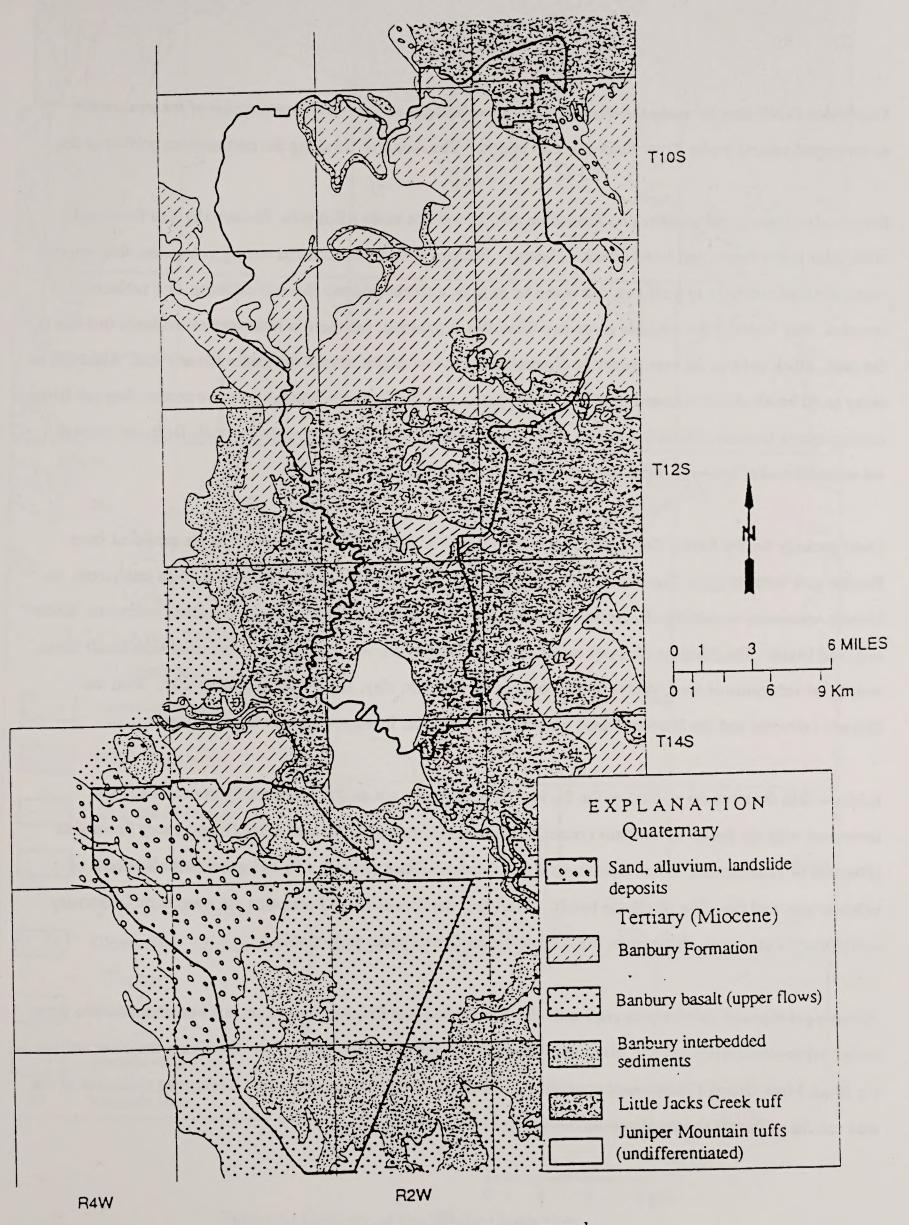


Figure 2.- Geology of the State's range proposals (Modified after Ekren and others $(\underline{4})$)

The Saylor Creek sites lie along the edge of the Owyhee uplands and the southwestern part of the structurally downwarped central Snake River Plain volcanic system. The sites also lie along the northeastern portion of the

Bruneau-Jarbidge eruptive center that formed its own subsidence basin filled with Tertiary rhyolite flows and tuffs, later basalt flows, and interbedded sediments. Because subsidence occurred during volcanism, this eruptive center evolved similarly to a caldera, but is too large to be a single caldera. Several calderas, or a caldera complex, may underlie the volcanic rocks that filled this depression, but there is little surface evidence that this is the case. Rock units in the area generally dip northward at low angles toward the Snake River Plain. Although as many as 40 basalt shield volcanos have been identified within the Bruneau-Jarbidge eruptive center, they are fairly inconspicuous because of their low profiles. Several northwest-trending high-angle (normal) faults cut through the volcanic rocks; however, most have very little displacement (2).

Local geology for the Saylor Creek sites is shown in figure 3. The following descriptions are modified from Rember and Bennett (13). The oldest exposed rocks, Miocene in age, have been generalized into one group, the Idavada volcanics, consisting of rhyolite and latite lava flows and welded tuffs with interbedded sediments, silicic tuff, and basalt. The Pliocene Banbury basalt, overlies the Idavada volcanics and consists of olivine basalt flows over basal sediments of sand, pebble and cobble gravel with silt, clay, silicic tuff, and diatomite. Both the Idavada volcanics and the Banbury basalt are associated with the Bruneau-Jarbidge eruptive center.

Rocks within the northern portion of the Saylor Creek sites area are mostly sedimentary in nature and are associated with the Snake River Plain system. The oldest formation in the area is the Glenns Ferry Formation (Pliocene to Pleistocene). It has been mapped into two units: one of sand, silt, and gravel with thin beds of volcanic ash, and the other of olivine basalt. Overlying the Glenns Ferry Formation are a series of Quaternary sedimentary formations. First is the Pleistocene Tuana Gravel consisting of silicic

volcanic pebbles and cobbles with sand and silt. The Pleistocene Bruneau Formation has been mapped into three units: white-weathering fine silt, clay, and diatomite; fan gravel; and basaltic lava. Overlying the other units is the Black Mesa Gravel (Pleistocene) consisting of a caliche-capped sand and gravel. Remaining sediments of the area consist of Recent stream alluvium.

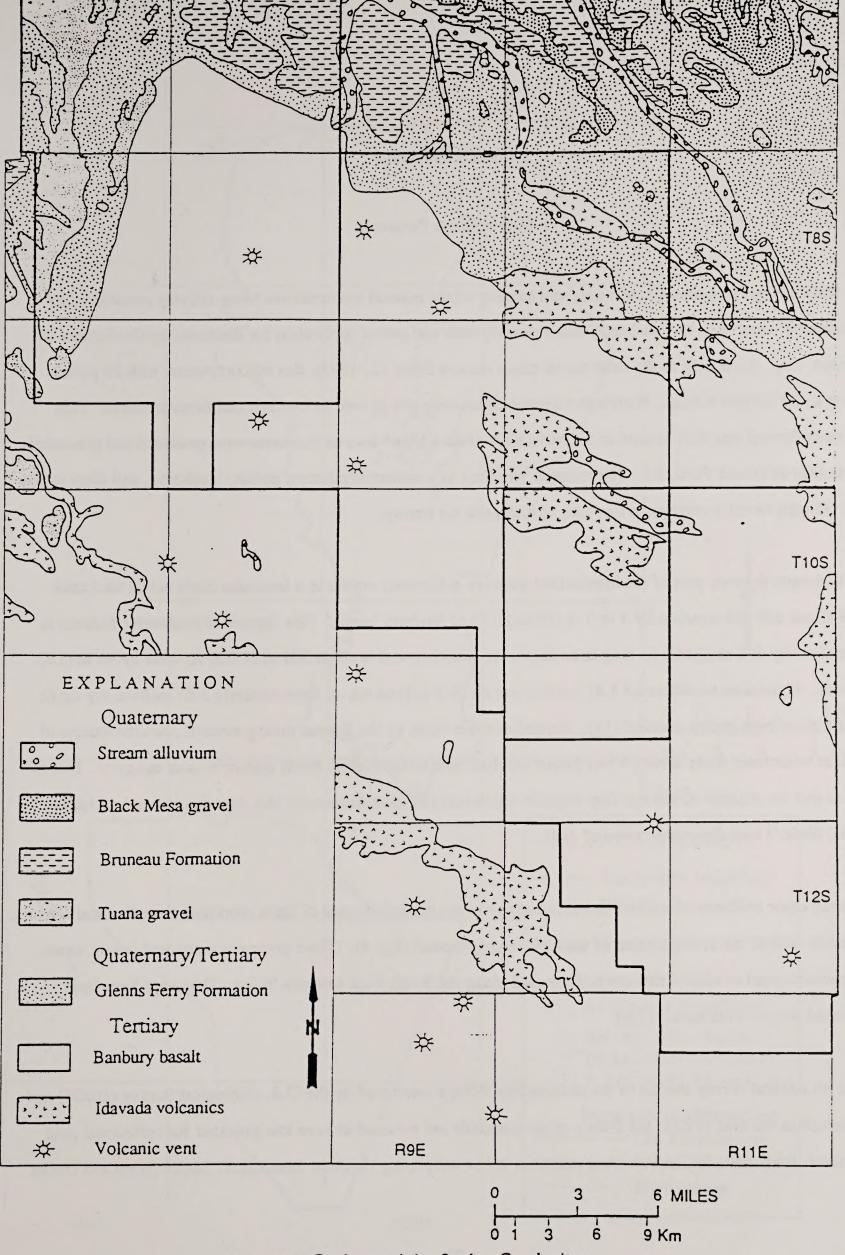


Figure 3.- Geology of the Saylor Creek sites (Modified after Malde and other (8), and Rember and Bennett (13))

Mineral Resources

State's Range Proposals

The State's range proposals contain only one locality where mineral resources are being actively pursued. The Dickshooter Mine (fig. 4) is currently under development and patent application for diatomite by Grefco Inc. of Lompoc, CA. According to the most recent claim records (May 12, 1992), this site is covered with 21 placer claims and 9 millsite claims. Workings consist of numerous pits as well as backhoe and dozer trenches. This diatomite deposit was first located in the mid 1930s when a "few" tons of diatomite were produced and processed at a facility in Grand View, ID. The material was used as a cement admixture, polish, insulation, and filter media (12). Grefco recently removed a few tons of diatomite for testing.

The diatomite deposit, part of the interbedded Banbury sediments, occurs in a lenticular basin cut in the Little Jacks Creek tuff and overlain by 3 to 6 m (10 to 20 ft) of Banbury basalt. This deposit of freshwater diatoms is approximately 610 m (2,000 ft) long in an east-west direction, and is about 305 m (1,000 ft) wide by 46 m (150 ft) thick. It contains an estimated 3.81 million wet mt (4.2 million st), or approximately 1.81 million dry mt (2 million st) of high-purity material (16). Several samples taken by the Bureau during mineral resource studies of adjacent wilderness study areas (WSA) placed the diatomite in the highest (best) industrial uses category. Due to its size and the absence of ash and clay impurities (common to most diatomite), this deposit was, and probably still is, Idaho's best diatomite "reserve" (14).

The only other evidence of mineral resource activity in the immediate area of these proposals are a few scattered prospects west of the lower portion of the split-range proposal (fig. 4). These prospects contained jasper, agate, and common opal in altered rhyolite tuff exposed along the South Fork Owyhee River. They may have been excavated for precious metals (1,6).

Based on mineral survey studies of the surrounding WSA's conducted by the U.S. Geological Survey (USGS) and the Bureau in the mid 1980's, the State's range proposals are assumed to have low potential for epithermal gold and silver, lead, zinc, tin, and uranium resources in the underlying rhyolitic formations. Major rivers and creeks

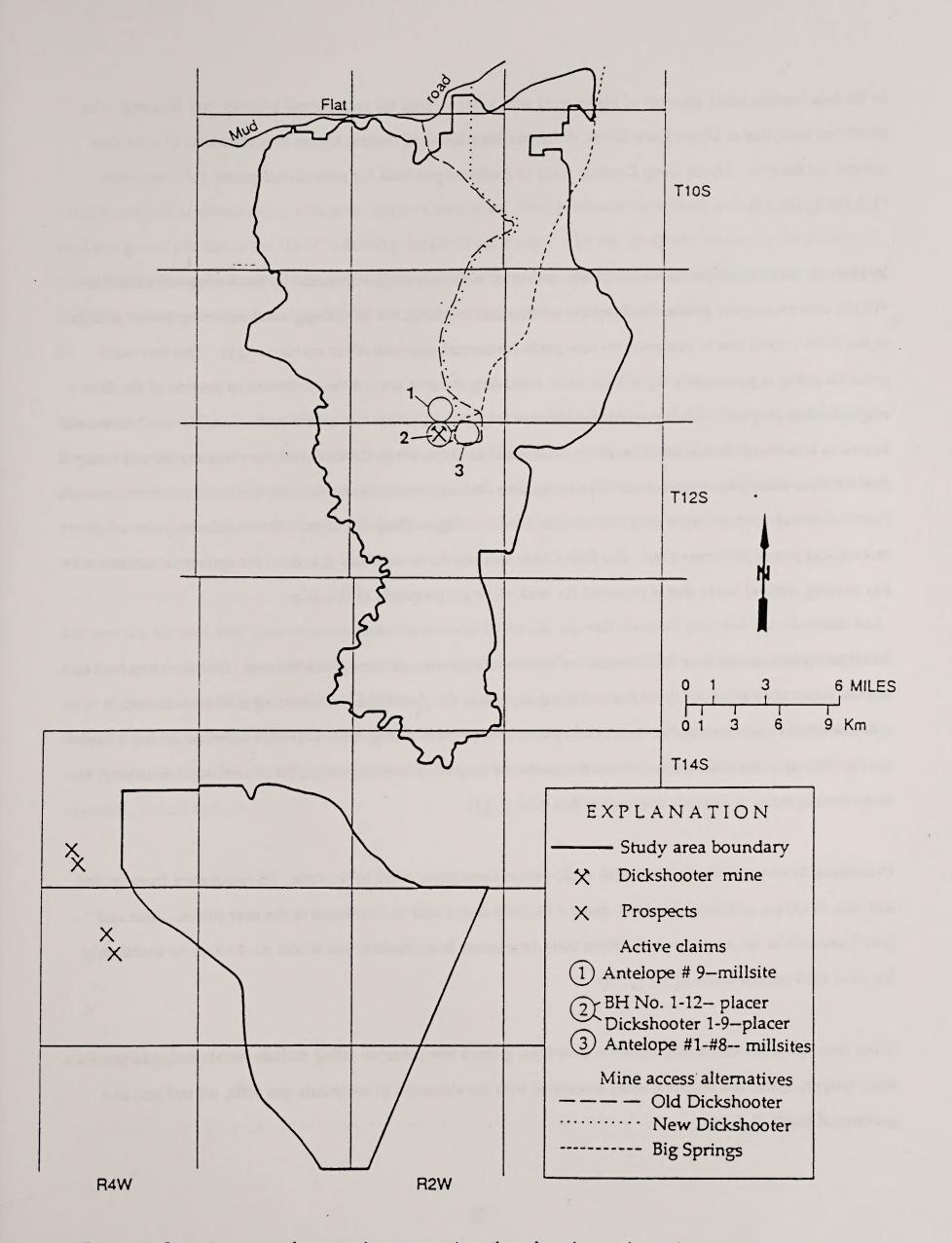


Figure 4.- Location map of past and present mineral exploration and development activity, State's range proposals (Access alternatives provided by Grefco)

in the area contain small amounts of placer gold with low potential for recreational panning and dredging. An identified exception is Upper Deep Creek which has been found to contain higher concentrations of gold than normal for the area. Upper Deep Creek is rated as moderate potential for recreational placer gold resources (1,6,7,9,10,11,14).

In 1989 the BLM conducted a 60-day public review of mineral surveys conducted by the Bureau and USGS in WSA's surrounding the proposal. Based on information provided, the USGS upgraded mineral potential ratings in the WSA's from low to moderate for low-grade epithermal gold and silver resources (19). This increased potential rating is particularly significant when evaluating the area around the northwestern portion of the State's original range proposal. Studies by Minor and others (10) suggest that this area is part of a caldera. Calderas are known to be sites of epithermal alteration. Gold found in Upper Deep Creek has all the characteristics of being derived from a fairly close source and may have come from alteration associated with this caldera. For this reason Pole Creek may contain placer gold occurrences similar to Upper Deep Creek and, thus, moderate potential for recreational placer gold resources. The Pole Creek area should be carefully examined for epithermal alteration in any ensuing mineral study that is prepared for land exchange proposals in this area.

Small low-grade occurrences of diatomite are exposed along canyons throughout the area. None are expected to ever be economic because of their size and impurities; thus the potential for discovering additional diatomite resources in the area the area has been rated as low. Despite this rating, there is always a possibility that a high-quality diatomite deposit exists somewhere beneath the Banbury basalt; however, the likelihood of discovery, let alone development, is difficult to assess at this time (7,14).

Dimension stone (specifically basalt slab rock) occurs throughout much of the area. Its remoteness from market and lack of unique qualities, however, make it unlikely that it will be developed in the near future. Sand and gravel deposits in the area also suffer from their remoteness from markets and would most likely be useful only for local road improvement (9,10,11,14).

Other area resources which may exist but have been given a low potential rating include zeolite and semi-precious stone (jasper, agate, and common opal) associated with the alteration of sediments and tuffs, oil and gas, and geothermal fluids (1,6,14).

Saylor Creek Sites

No active mines or claims occur within the Saylor Creek sites. Two prospects are located within Site 1, and two sand and gravel pits are in the USAF's existing Saylor Creek Range. The two prospects located in the sediments of the Glenns Ferry Formation, were primarily explored for uranium. An additional prospect just outside and east of Site 1, also apparently within the Glenns Ferry Formation, may have been explored for uranium as well (fig. 5).

Most of the area's identified resources and mineral activity occur within the canyons of the Bruneau and Jarbidge Rivers, where these river canyons cut through the unmineralized Banbury basalt to expose older, more mineralized rock types underlying them. Resources include gem-quality "Bruneau Jasper" and other collectable semi-precious stones, limestone, zeolite, and placer gold. Several geothermal sites occur along and near these river canyons.

Because the Saylor Creek sites are predominately covered by basalt, mineral resource potential for all metals and most industrial minerals is considered low. Dimension stone (specifically basalt slab rock) occurs throughout most of the area. Its remoteness from market and lack of unique qualities, however, make development unlikely. Sand and gravel deposits in the area would most likely be useful only for local road improvement. Lands in the area have been classified as prospectively valuable for geothermal resources (low- to moderate-temperature systems), and oil and gas (17, 18).

Economics

Mining

The economics associated with mining was assessed for Owyhee County, where projected mining and mineral processing in conflict with the training range alternatives will occur, and for Elmore County, the most likely source of the support services to the mining operations. According to figures from the Bureau of Economic Analysis, U.S. Department of Commerce (April 1991), the mining industry has a significant role in Owyhee County's overall economics. Total full- and part-time employment for 1986 (latest complete data) was reported at 3,346 with 177 or 5.29% directly associated with mining. Total personal income for that year was \$67,804,000 with earnings of \$6,186,000, or 9.12%, directly attributable to mining. In Elmore County, the mining industry did not have a important role in the overall economics. Total full- and part-time employment for 1989 (latest year reported) was 10,953 with 27 or 0.25% directly associated to mining. Total personal income for that year was \$264,236,000 with earnings of \$586,000 or 0.22% directly attributable to mining.

Mine/Mill Model For The Dickshooter Diatomite Deposit

As part of the cooperating agency agreement with the USAF, the Bureau developed a generic mine/mill model for a standard-sized diatomite operation. This model was used to estimate the probable economic impact to the region that would result from mining the Dickshooter diatomite deposit. The mill model was designed using a 50,000 st/yr (45,400 mt/yr) dry product processing plant, common to the diatomite industry. The mining portion of the model represents a standard open pit operation with a few modifications to reflect the deposit's geologic and geographic setting. This generic mine/mill model for diatomite incorporated the following additional conditions: (1) a known geologic reserve of 3.81 million mt (4.2 million st) wet ore; (2) a 2:1 stripping ratio; (3) a basalt cap that requires drilling and blasting (rest of rock can be ripped); (4) the removal of ore by scrappers; (5) the removal of water, 50% of ore by weight, during processing; (6) upgrading of 25.7 km (16 miles) of access road; and (7) a 180 day per year mining operation due to poor winter conditions.

Following preproduction development, open pit mining would commence at a rate of 504 mt/d (556 st/d) ore and 1,008 mt/d (1,112 st/d) waste, one shift per day, 180 days per year. Mining would require drilling and blasting,

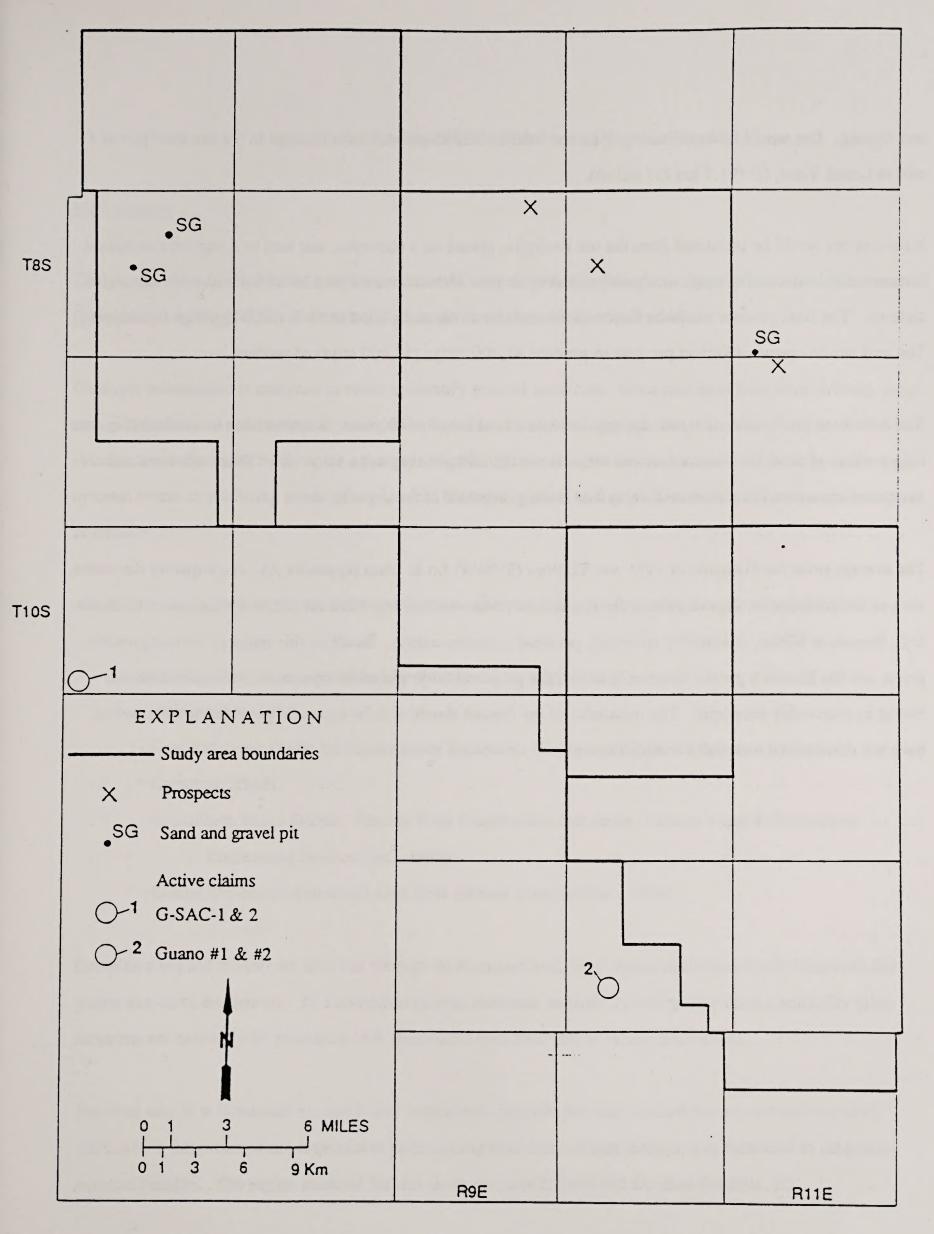


Figure 5.- Location map of past and present mineral exploration and development, Saylor Creek sites area

1

and ripping. Ore would be loaded using front end loaders into 35-yd trucks for haulage to the ore stockpile at a mill at Grand View, ID (91.7 km (57 miles)).

Mine-run ore would be reclaimed from the ore stockpile, placed on a conveyor, and sent to a magnetic separator, hammer mill, roller mill, dryer, air classifiers and cyclones. Material would then be mixed with soda ash and sintered. The final product would be further sized and classified, and placed in 50 lb (22.7 kg) bags for shipping. The mill would operate 360 days per year to produce 45,400 mt/yr (50,000 st/yr) of product.

Based on these production rates, the deposit could be mined for over 40 years; however, due to uncertainties over long periods of time, the Bureau does not estimate a mine/mill plan beyond a 20-yr life. These estimates and associated economic benefits, therefore, reflect mining only half of the deposit.

The average price for diatomite in 1991 was \$219/mt (\$199/st) f.o.b. plant (appendix A). High-quality diatomite, such as the Dickshooter deposit, if sold for use as filler, was worth nearly \$250/mt (\$227/st) (Lawrence L. Davis, U.S. Bureau of Mines, commodity specialist, personal communication). Based on this range of current possible prices and the Bureau's generic mine/mill model, the proposed 20-yr diatomite operation, as described above, would be reasonably economic. The remainder of the deposit should also be economic provided market factors have not deteriorated materially during this time.

Input/Output Analysis Of The Dickshooter Diatomite Deposit

Methodology

The general steps in the Bureau's regional economic analysis are: (1) geologic analysis/resource identification; (2) mine and mill model development; (3) economic analysis; and (4) impact analysis.

Geologic information is analyzed in order to identify mineral resources. Once resources have been defined, mine and mill models are constructed for each of the deposits. For operating properties, the mining and processing systems currently in use by the mine operator are used. When site specific data are unavailable or proprietary, systems in use at producing mines of comparable commodity, size, and grade are used to estimate engineering parameters.

All costs are calculated in current dollars. They are estimated using the following sources of information:

- Mining Cost Service, published by Western Mine Engineering (Schumacher, 1985)
- Cost Reference Guide for Construction Equipment (Equipment Guide Book Company, 1986).
- Richardson Rapid System, Process Plant Construction Standards, Volume 3 and 4 (Richardson Engineering Services Inc., 1984).
- Means Building Construction Cost Data (Means Company Inc., 1989).

Completed deposit models are then run through an economic analysis program that simulates development and production from the deposit. To standardize output, economic analysis is used to determine commodity price requirements necessary to generate a 15% discounted cash flow rate of return (DCFROR).

The final step is to determine economic and employment impacts that may result from mineral development. IMPLAN, a microcomputer program that performs regional input-output analyses was then used to determine regional benefits. The region modeled for this study includes Elmore and Owyhee Counties, ID.

Regional Impacts

Table 1.--Estimated yearly economic impacts of development at the Dickshooter diatomite deposit

	Total	2		
	<pre>Industry Output (million \$)</pre>	Employee Compensation (million \$)	Employment (Jobs)	Years
Construction Direct Impacts Indirect Impacts Total Impacts	22.759	3.852 0.420	107 31	1
Operation Direct Impacts Indirect Impacts Total Impacts	7.042	1.731 0.192	48 14	20 20

Total Industry Output - The total value of all production for an industry or industries.

Direct Impacts - Economic activity resulting directly from mine construction and operation.

Indirect Impacts - Economic activity resulting from transactions within supporting local industries and the induced effects due to household spending.

Employee Compensation - Wages and salaries paid to employees by firms.

Employment - Full-time employees plus the number of part time employees converted to a full-time basis.

CONSEQUENTIAL IMPACTS

Mineral Resources

General

Although public domain land exchanged with the State is no longer subject to mineral entry and location under the Mining Law of 1872, mineral resources could become leasable, subject to State approval. Because the State is to acquiring this land for the specific purposes of a USAF training range, it will probably not be available to mineral exploration and development for as long as the USAF desires to continue its 10-year leases. Conflicts with existing mineral operations will have to be resolved between the BLM and the State prior to land exchange and leasing. The area surrounding the USAF's training range, retained under the jurisdiction of BLM, will be managed as a buffer zone and will remain open and accessible for mineral resource activities under the existing federal mining laws.

State's Range Proposals

Both State's range proposals have the potential to impact mineral resources. Of particular concern is the gold potential in the Pole Creek area and the diatomite deposit along Dickshooter Creek.

Both the original and the split-range proposals include much of the moderate potential for placer and lode gold in the Pole Creek area. Exchange of this area to the State for lease to the USAF will likely preclude recreational gold panning and the chance for discovery of any unknown epithermal gold deposit that may exist in the area. The significance of this impact is uinknown at this time due to the lack of detailed mineral exploration in the area.

In assessing impacts to the Dickshooter diatomite deposit, two aspects of its anticipated development must be considered: the minesite and the access road to the site. While only the original proposal could impact the minesite, both the original and split-range proposals can impact access to the site.

A land exchange should not adversely impact the minesite since BLM cannot exchange land with active mining claims, and Grefco believes the entire diatomite deposit is under active claim. Land exchanges to the State, however, could make disposal of waste material, such as the overburden, difficult if enough adjacent land has not been claimed to meet disposal requirements (millsite claims).

Training range proposals to the north of the deposit could adversely impact reasonable road access to the site. The costs to construct or upgrade roads and transportation of ore during production are important to the economic viability of the deposit. The shortest route from the mine to the processing plant, requiring the least amount of new road construction or upgrading, would have the least economic impact and therefore is preferred by Grefco. The northeast-trending Mud Flat road, which passes along the northern boundary of the original State proposal area, provides the best access from the mine to a processing plant situated in Grand View, ID. Reasonable access from the minesite to Mud Flat Road, however, requires a northern right-of-way through the proposed training range. Alternate routes to the east or west will add to the length of road construction and upgrading, and to the ore trucking distance. Both the east and west routes would add substantially to the mine cost and may render the deposit uneconomical to mine. If conflicts between range proposals and reasonable mine access cannot be resolved by modifying the proposals, the USAF and/or the State may have to choose another site for the training range or acquire Grefco's mineral interest in the area because BLM is mandated by law to maintain reasonable access to the mineral property.

Saylor Creek Sites

No mineral resources or mineral resource potential of any significance have been identified within the Saylor Creek sites. Therefore no significant impacts to mineral resources resulting from the selection of any of these training range proposals are expected.

Economics

State's Range Proposals

Both proposals could conflict with the economic development of the Dickshooter diatomite deposit. If the deposit is not developed, estimated economic benefits that would be lost include: \$22.7 million in direct and indirect total industry output during the 1 year of mine and plant construction; \$7.0 million in annual direct and indirect total industry output for the 20-year mine and plant operation with a cumulative 20-year direct and indirect total industry output of \$140.5 million; 138 direct and indirect jobs with employee compensation of \$4.3 million created during the 1 year of mine and plant construction; and 62 direct and indirect jobs with annual employee compensation of \$1.9 million created by the 20-year mine and plant operation, or a cumulative 20-year employee compensation of \$38.5 million (table 1). These figures only include the first 20 years of mining. An additional 20 years of mining, and the associated economic benefits, could also be lost. This assumes that the remainder of known reserves would be mined at a similar production rate and that there is still a market for this material.

There is also the possibility that an acquisition cost would be realized. This cost would be the cash compensation to Grefco for the "taking" of their deposit. It would be paid by the "taking" party, most likely the USAF and/or the State, and would probably be a determined in-ground value for the entire diatomite deposit.

Saylor Creek Sites

No foreseeable mineral resource developments were identified within the Saylor Creek sites. Therefore no known adverse impacts to mineral economics are expected to occur.

CONCLUSIONS AND RECOMMENDATIONS

Only one area of moderate mineral potential and one significant mineral deposit are known to exist within the Idaho training range alternatives for the USAF's proposed air-to-ground training range. No other conflicts with mineral resources of any significance are known at this time.

Mineral exploration in the Pole Creek area could result in additional discoveries of recreational placer gold resources and low-grade epithermal gold deposits. It is recommended that as much of this area as possible remain BLM-managed public land under a multiple-use buffer zone.

Based on the assumptions made in this report, the Bureau's estimate for a standard-sized operation at the Dickshooter diatomite deposit is that the operation would be reasonably economic under current market conditions. The regional input/output analysis (IMPLAN) shows that development of this diatomite deposit would have a long-term benefit to the economies of Owyhee and Elmore County. The most economically desirable proposal for an air-to-ground training range in Owyhee County would be one which allows for both the training range and the mining of the diatomite deposit to coexist.

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APPENDIX A.--MINERAL COMMODITY SUMMARY FOR DIATOMITE

DIATOMITE

(Data in thousand metric tons, unless noted)

1. Domestic Production and Use: The estimated value of processed diatomite, f.o.b. plant, was \$128 million in 1992. Five companies with 11 processing facilities in 4 States produced diatomite. California and Nevada were the principal producing States. End uses of diatomite were filter aid, 72%; fillers, 14%; and other, 14%.

2.	Salient Statistics—United States:	1988	1989	1990	1991	1992*
	Production ¹	629	617	631	610	647
	Imports for consumption	3	1.	1	(²)	(2)
	Exports	. 147	137	144	152	170
	Consumption, apparent	485	481	488	458	477
	Price, average value, dollars per ton,					•
	f.o.b. plant ·	-229	· 222	219	229	197
	Stocks, producer, yearend	36	36	36	36	36
	Employment, mine and plant*	1,000	1,000	1,000	1,000	1,000
	Net import reliance ³ as a percent					
	of apparent consumption	E	E	Ε	E	Ε

3. Recycling: None.

5.

4. Import Sources (1988-91): Mexico, 49%; Germany, 46%; and other, 5%.

Tariff:	ltem	Number ;	Most favored nation (MFN) 1/1/93	Non-MFN ⁴ 1/1/93
similar :	fossil meals and siliceous earths, of			•
an appa of 1 or	rent specific gravity less	2512.00	Free	Free.

- 6. Depletion Allowance: 14% (Domestic), 14% (Foreign).
- 7. Government Stockpile: None.

^{*}Estimated. E Net exporter. NA Not available.

¹Processed ore sold and used by producers.

²Less than 1/2 unit.

³Defined as imports - exports + adjustments for Government and industry stock changes.

^{&#}x27;See Appendix B.

See Appendix A for definitions.

fincludes sales of moler production.

⁷As constituted before Dec. 1991.

DIATOMITE

8. Events, Trends, and Issues: The United States remained the largest producer and consumer of diatomite and exported processed diatomite to more than 50 countries, primarily for filtration use.

All domestic mining is by open pit, and conflicting land use problems exist. Control of dust in mining is adequate because of the high moisture content of the crude ore. Almost all processing is enclosed to permit effective control of silica dust.

9. World Mine Production, Reserves, and Reserve Base:

grote the	Mine pro	oduction 1992*	Reserves ⁶	Reserve base ⁵
United States ¹	610	647	250,000	500,000
Brazil	20	20		2,000
Denmark ⁶	61	65		NA
France	250	250	Other	2,000
Germany, Federal Republic of	50	50	countries:	NA
Iceland	22	25	550,000	2,000
Italy	23	25		NA
Korea, Republic of	55	60		NA
Mexico	55	55		. 2,000
Romania	40	50	·	NA
Spain	80	, 100		NA
U.S.S.R. ⁷	220	200		NA
Other countries	70	53		NA
World total	1,556	1,600	800,000	Large

- 10. World Resources: World resources of crude diatomite are adequate for the foreseeable future, but the need for diatomite to be near markets encourages development of new sources for the material.
- 11. Substitutes: Many alternate materials can be substituted for diatomite; however, the unique properties of diatomite assure its continuing use for many applications. Expanded perlite, asbestos, and silica sand compete for filtration purposes, although, in most instances, diatomite is a superior material. Alternate filler materials include talc, ground silica sand, ground mica, clay, perlite, vermiculite, and ground limestone. For thermal insulation, materials such as brick, clay, asbestos, mineral wool, expanded perlite, and exfoliated vermiculite can be used.

APPENDIX B BLM AND GREFCO CORRESPONDENCE

August 17.1992

To:J.C. Harksen. USBLM

Re:Ulokshooter
Mine Access

cc: Mike Dunn. USBM

327 559 10 3 St 60

BUREAU OF L. ... FRANKAGE SENT BOISE SISTRICT OFFICE

Dear J.C..

Thank you for working so hard on a recent hot monday to visit our claims and collect samples.

I have obtained clearance from upper level management, and they have no problem with the BLM approaching any diatomite competitors to run samples. A question arose as to who would pay for the test? I might suggest talking with Craig Smith of Celite Corporation (805)737-1247 or Eagle Pitcher Corporation in Vail, Oregon. We have a slight preference that you use Celite Corporation.

I am enclosing some maps showing our current thinking on access into the Dickshooter mine.

For all practicle purposes, access to the Dickshooter property makes sense only from the north. For support facilities and shipping reasons a processing destination in the snake river valley is required. Going east (Duck Valley) south (?) or west (Jordon Valley) does not provide realistic destination points. Also these other directions would involve very long road building projects.

The existing Dickshooter road (D,B,E,H,J-I) is an acceptable exploration access road. This road offers little as an operating access and haul road. Locating a new road along this "track" offers few savings because of previous development. The only reason to follow any of the existing "tracks" in the Dickshooter country is to avoid any new disturbances. This road is 19 miles long and would result in a total haul distance to Grandview of 62 miles.

attached maps. I will refer to the new routes as the new Dickshooter road and the Big Springs road. Both of these routes are preferable to the existing Dickshooter road.

The first alternative. and the one most studied is the new Dickshooter road (C.A.B.mE.F.G.I). This road is 17 miles long and would result in a haul distance to Grandview of 57 miles. This route provides several positive penifits over the old Dickshooter roads.

- 1.) Crosses no private land.
- 2.) Shorter net hau distance.
- 3.) Considerably less road building (17 vs. 19 miles).
- 4.) Improved grades.
- 5.) Keeps activities completely out of the Dickshooter Reservoir drainage.

This road has been walked and examined along most of its lenght. Point A is marked by a rock pile and lath. Point B & E are marked with a rock pile and top stone painted orange. Point F is the N.W. corner of the BH placer claim. The section of road E-F-G is marked by rock piles and lath at about 200 foot intervals.

The second road alternative, the Big Springs road has not been as thoroughly studied (K,H,F,G,I). This road is 20 miles long but would offer a total haul distance to Grandview of only 53 miles. This road has the disadvantages of crossing private land and requiring more road construction (20 miles vs. 17 miles) than the Dickshooter alternative.

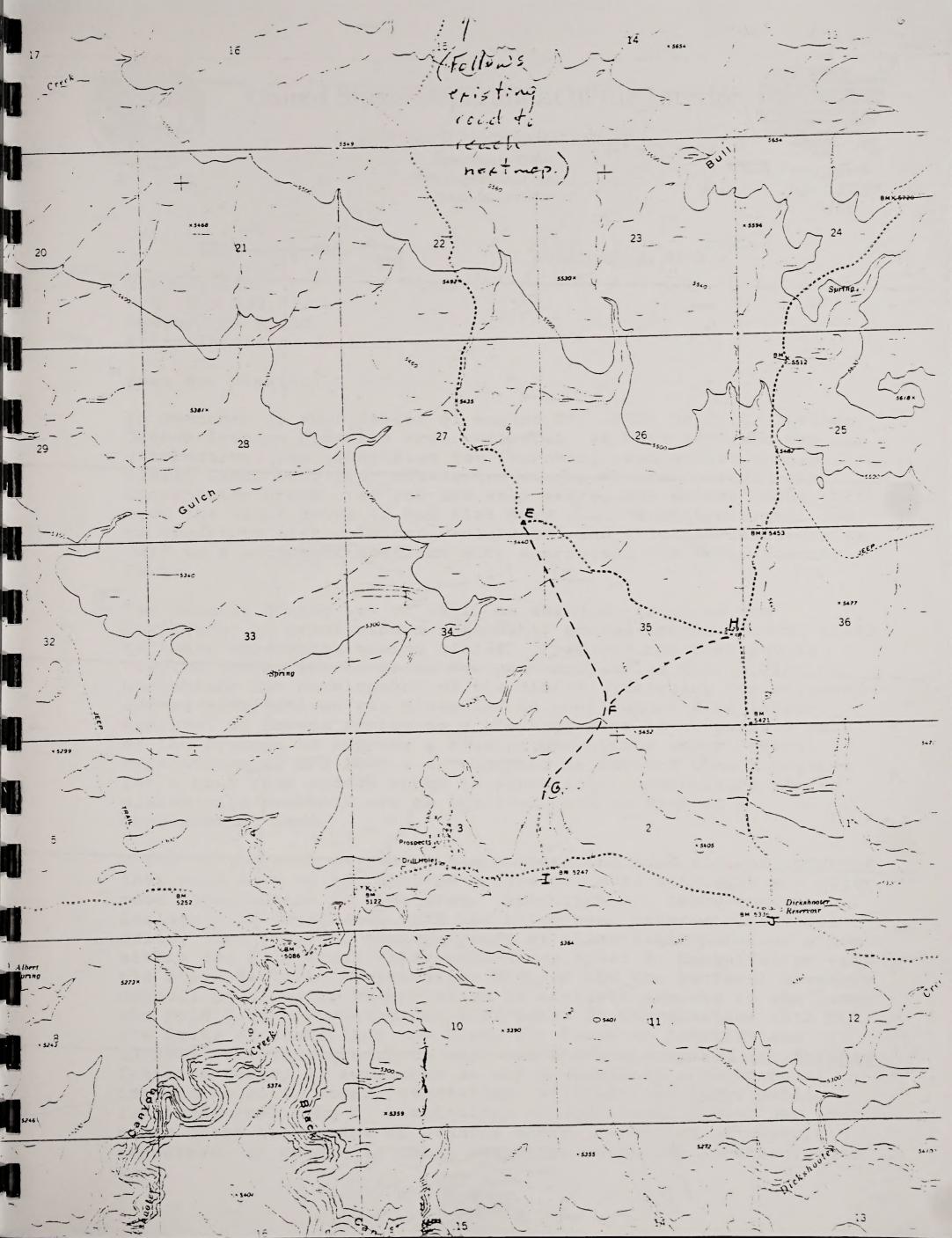
Portions of this road have not been traveled in years because of its poor condition. Some highlighted routes may need adjusting due to grade and drainage considenations.

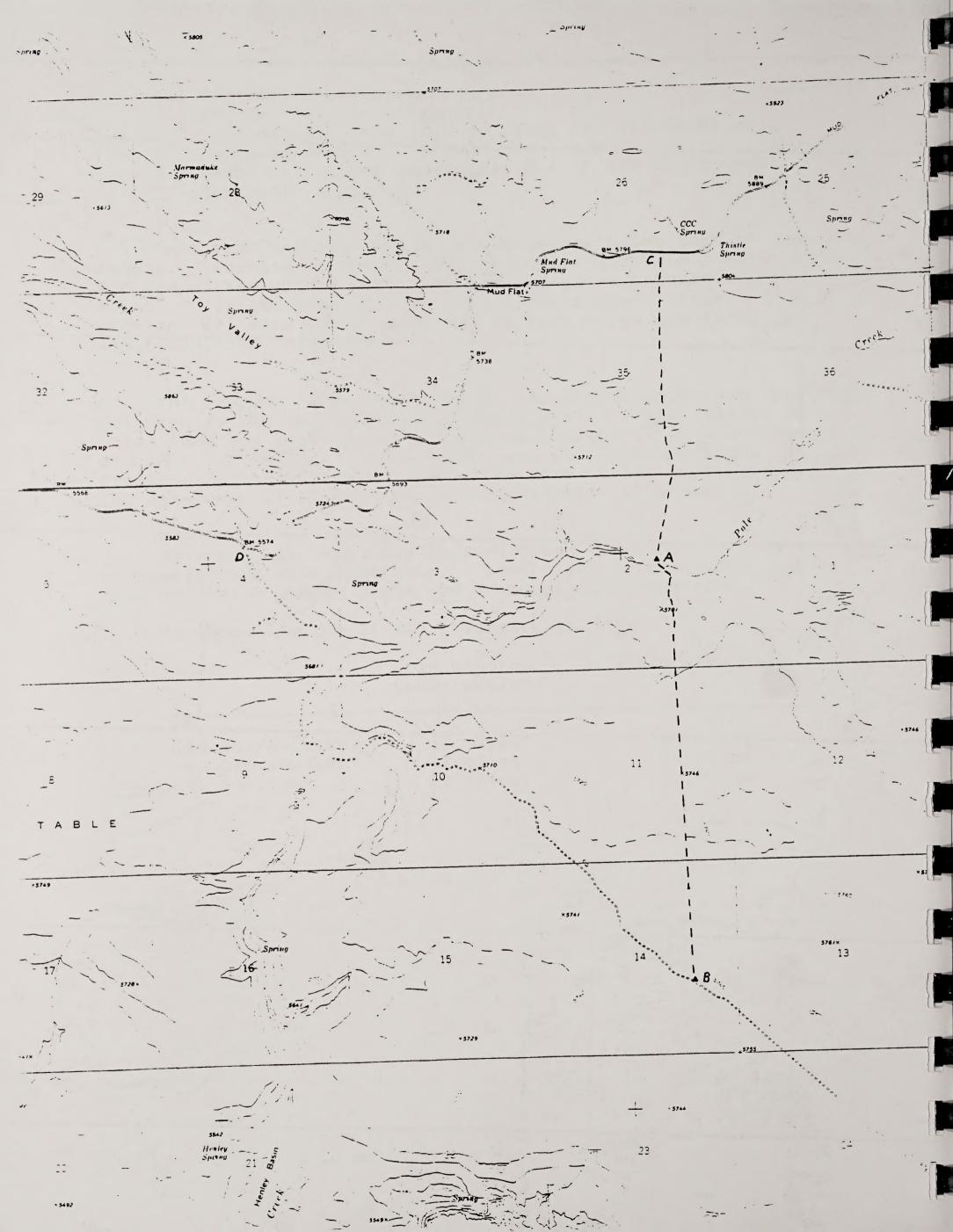
To summarize the 3 road alternatives.

Road	Road Needing Construction	Grand View Haul
Old Dicksh New Dicksh Big Spring	nooter 17 Miles	62 Miles 57 Miles 53 Miles

Sincerely,

David A. Jenkins







United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Boise District Office
3948 Development Avenue
Boise, Idaho 83705



February 4, 1993

Grefco, Inc. P.O. Box 939 Lompoc, CA 93438 Attn: David A. Jenkins

Dear Mr. Jenkins:

In response to your letter of August 27, 1992, to J. C. Harksen, Owyhee/Bruneau Resource Area geologist, we have reviewed the alternatives you identified for improving road access across public lands into your unpatented mining claims located near Dickshooter Creek. As you are well aware, any access route north from the claim group to Mud Flat Road will be controversial due to conflicts with cultural, wilderness and wildlife resources as well as a potential conflict with a proposed Air Force Bombing Range.

The General Mining Law of 1872, as amended, requires the government to grant miners reasonable access across Federal lands to their unpatented mining claims. Probably the best way to resolve the access issue is for your company to file a Plan of Operations for development of the claims, including the proposed access alternatives you presented in your August 27th letter. Approval of access routes to a proposed mine is normally a part of the process to approve a Plan of Operations under Federal regulations 43 CFR 3809.1-4. Pleased be advised that a request for a haul road access route to essentially undeveloped mining claims will probably not be approved, due to lack of a demonstrated need.

Prior to approval of such a plan, there are some serious concerns that will have to be resolved before we could authorize any major road construction in that area. Specifically, these concerns include: 1) Compliance with the wilderness interim management policy that requires nonimpairment of wilderness characteristics within the Pole Creek Wilderness Study Area; 2) Consultation with the State Historic Preservation Officer and the National Advisory Council on Historic Preservation to mitigate impacts to the Camas and Pole Creek Archeological Districts; 3) Coordination with BLM, the State of Idaho, and the U. S. Air Force to identify and address potential conflicts with the State's proposed Big Springs Training Range; 4) Avoidance of any unnecessary environmental impacts to soil, water, vegetation, wildlife and other public land resources; and 5) Limitations on additional public use that could cause harassment of bighorn sheep, vandalism of cultural resources, or damage to other sensitive resources in this remote area.

As you can see, the construction of a haul road as well as an open-pit mine would involve a significant number of environmental impacts. It is our opinion that an Environmental Impact Statement (EIS) would have to be prepared prior to authorization of the haul road (and mine) through approval of a Plan of Operations. Since our District's funding is limited, it would be advisable for your company to contract the EIS to facilitate processing any Plan of Operations you would file to allow construction of an access route to your proposed mine. This procedure has worked well for other mining companies in your situation. We would be happy to meet with you to discuss options for meeting our legal and regulatory requirements.

We appreciate your cooperation on maintaining the existing Dickshooter road and are willing to work with you on establishing a haul road that meets your needs. If you would like to schedule a meeting, or if you have any question regarding this matter, please contact me at (208) 384-3330.

Sincerely yours,

Signe Sather-Blain

Signe Sather-Blair Acting Area Manager Bruneau Resource Area

cc:

Governor Andrus
David Jett
Major Hamer

SAIC
Owyhee County Commissioners
ISO (923,932)

APPENDIX C STATE OF IDAHO CORRESPONDENCE



STANLEY F. HAMILTON DIRECTOR

May 26, 1993

BOARD OF LAND COMMISSIONERS CRICIL D. AMERICA GOVERNOR

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LAWY ECHOHAWK
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DEST of Public
Instruction

Susan Blacketer
Science Applications
International Corporation
Environmental Programs Division
405 S. 8th Street
Suite 201
Boise, ID 83702

Dear Ms. Blacketer:

This letter is in response to our telephone conversation on May 25, 1993, whereby you requested that I send you a letter stating there are no mineral leases on the properties in connection with the training range.

There are no mineral leases on the lands connected with the training range as of May 17, 1993.

If I can be of any further assistance, please notify me at the above address or call me at 334-0245 or call Alvin Carr at 334-0260.

Sincerely,

May Hodges

Mary Hodges, Technical Specialist Bureau of Real Estate

mh

BLM LIBRARY
BLDG 50, STATEMA
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, COLORADO 80225

